INCIDENT AT AVIANO
The Story of a Very Brave Man

About 55,000 words

Acknowledgements

Incident at Aviano honors the brave, selfless soldiers, sailors, and airmen who maintain our nation's nuclear weapons.

The book is dedicated to my mother, Claudia. She was my father's life-long love and companion. They built a remarkable relationship as they travelled around the nation and the world during his military career. She was a complicated woman, who suffered terribly at death from COPD, after living to ninety-four. God rest her.

The help of my wonderful wife and life-partner Helen must always be acknowledged in every accomplishment I strive to make. She blessed my world for far too short a time. May she rest in peace. She will always own my heart.

Author's Note

The names and descriptions of most of the people described in this book have been changed. The conversations and some of the events portrayed are conjecture. Nevertheless, the central event depicted is true. In fact, a nuclear bomb was accidently activated at Aviano Air Base, Italy in November 1965. Only the heroism of a small group of dedicated men prevented its detonation. This group was led by my father, Dan Cassino. His life's odyssey took him to Italy twice—once to bomb the birthplace of his ancestors, then back again to help save another Italian town from terrible destruction. His career as an Air Force nuclear warrior is accurately described.

Nuclear weapons have been a reality since 1945. By the time the incident depicted in the pages that follow took place, there were tens of thousands of them in place around the world. Aside from our nation, Great Britain, France, the Soviet Union, and China all held nuclear weapons and were working to build more. Israel, Pakistan, India, and South Africa were feverishly working to develop them as well. The U.S. nuclear arsenal alone was greater than all the rest combined. This stockpile was destined to grow larger yet, before a series of agreements with the now defunct Soviet Union began its decrease.

With the rapidly rising number of these terribly poisonous, enormously powerful weapons in the hands of so many people, accidents were bound to occur. Public records currently available describe scores of such incidents, caused for the most part by aircraft mechanical failures. Aside from the near-disaster at Aviano, I am personally aware of several more—including the "cook-off" of a nuclear-tipped Nike Hercules missile in South Korea, as well as the improper storage of a nuclear pit "birdcage" in Germany. These incidents (and others) are not mentioned in the lists generally circulated to the public. They were quietly rectified and caused no physical injury, radiation exposure, property damage, or nuclear contamination. Still, they occurred. How many incidents in other nations less likely to report them have happened as well?

Based on the size of the arsenals in place then and now, at least fifty—but this guess might be very low. Accounts abound of large areas in the old Soviet Union which must be driven through quickly, with windows shut, due to severe radiological contamination. Hanford, Washington—once our nation's plutonium factory—will require decades of work and tens of billions of dollars to remediate. How many more nuclear wastelands exist around the world?

The command-and-control procedures described here have been extensively modernized since 1965. Thanks in great part to the foundational work of General Curtis LeMay, the United States boasts the best command-and-control procedures for the release of nuclear weapons in the world. The systems in place among other nuclear-armed nations range from similar to far more primitive. It is chilling to speculate how unsophisticated command-and-control might be in politically unstable Pakistan or North Korea's grim dictatorship.

Today, our nation is on the verge of spending billions, constructing new weapons manufacturing facilities, and potentially polluting more of our environment to replenish and refresh our nuclear arsenal. The Russians—and, to a lesser extent, the French and British—face the same awful necessity. Perhaps this is the point to return to sanity and allow time itself to erase this ghastly technology.

On the other hand, the North Koreans have proven decisively that any nation—no matter how poor or deprived—can become a nuclear power if she strives long and hard enough, even in the face of severe international disdain. Are we willing (or even able) to jeopardize our nation's security by giving up the weapons that have arguably protected us from Armageddon for almost eighty years? This book cannot answer such questions. It can only supply a brief glimpse of what the status quo might mean. If my father were alive, I wonder what his answer would be.

Chapter 1: Hitting the Numbers

They crouch on the edge of the tarmac, a pair of great war birds anxious to spring. These aircraft have no beauty, even in a brittle metallic sense. Their slab sides and stiff angles suggest no purpose other than brutal assault. They were created only to kill.

The engineers who designed the F4 Phantom II had no interest in pointless aesthetics. Their task was to build the best fighter jet in the world. The result wasn't pretty, but it was effective. No aircraft of its day was faster or more powerful. By the time the last of them left service to slowly decay in the Arizona desert, thousands had seen service with the Air Force, Navy, and Marine Corps.

Forget the rest. Focus only on these two Phantoms. They sit in revetments just off the runway at Aviano Air Base in northern Italy. It is four thirty local time—1630 hours, military—on a chilly Saturday afternoon in November. The year is 1965. An intermittent misty rain falls from a dark, pregnant sky. Nevertheless, two pilots sit in each aircraft—on hair-trigger alert, ready to react to aggression from Warsaw Pact forces in southern Europe. At midnight they will be replaced by four more. The alert is perpetual. It won't cease until the Cold War ends, or heats to a flash fire.

Focus further. Look at the men in the aircraft on the right: young, handsome in their flight suits, lounging in their cockpit seats. The Phantom II has two pilots, one in front (the primary), and another behind him (jokingly referred to as the "guy in back," or GIB). The primary pilot of this Phantom is First Lieutenant Randall Simms III. Just turned twenty-five, Randy has lived an almost perfect life. His wealthy family has made sure of it. The best schools, the best clothes, all has been provided. In return, he's worked hard at academics and sports, and has stayed out of serious trouble. As a young man, his even features and easy smile continue to make him popular.

Dad pulled a few strings to get him into the Air National Guard after college, shielding him from any chance of setting foot in a Vietnamese rice paddy. Some would call Randy Simms lucky.

Randy's Air National Guard wing is part of a "rotational" readiness program, which sends squadrons overseas to train with regular Air Force support units. This doubles his luck since it has allowed him to see Italy on Uncle Sam's dime. The training isn't bad either. Flying over breathlessly beautiful Mediterranean scenery to bombing and gunnery practice is not a bad way to develop and sharpen combat skills. The canals of Venice are just a short train ride away. The food is great, the wine is cheap, and the bars are filled with pretty women. If it weren't for alert duty, this assignment would almost be a vacation.

The whole idea of sitting in an airplane for eight hours waiting for the world to end makes little sense to Randy. His understanding of international affairs is limited, mostly due to lack of interest. Nothing terrible is going to happen today, or any other day, he knows. Nobody could possibly be so stupid. This alert exercise is simply a waste of time—like inspections, and parades, and most of the other things the lifer military does. He decides to have a smoke, but even this small pleasure is denied him. His GIB, Jack Lander, has left the cockpit already. He'll have to wait. Bored and restless, his eyes turn to what looks to be the face of a combination lock, set just below the center of his instrument panel. To pass the time, he begins to spin its dial, just as he and many others have done before.

Focus on that innocuous dial—white numbers etched into black Bakelite, centered with a brushed metal knob. The dial rotates with well-oiled ease, clicking busily as it moves the numbers on its face. It is part of a Permissive Action Link, also known as a PAL device. Three years ago, these devices didn't exist. After mounting requests from an increasingly nervous Congress, President John F. Kennedy mandated their installation before his untimely death.

National Security Action Memorandum 160, signed by him in 1962, requires PAL devices on all nuclear bombs, warheads, mines, depth charges, and artillery shells positioned in Europe: bombs like the B43 mounted below the centerline of the Phantom where Randy sits.

There's much more to the PAL than the small dial in Randy's cockpit. Sealed within the casing of the thermonuclear bomb hanging a few feet below his seat is a complex weapon-initiating device, designed by Sandia Labs and powered by a small plutonium heat source of its own. Once activated, it will begin opening circuits to arm the bomb—actions that are essentially irreversible. Randy may be aware of all of this. Like the rest of his squadron's pilots, he has been briefed on the PAL and what it does. Still, spinning the dial hardly seems risky, even though he and the others have been warned against it. The odds against randomly finding the correct four-digit code are impossibly high (more than one hundred thousand to one at that time). Even so, the young pilot feels a small, vicarious thrill every time he twirls the PAL's dial.

The thud of boots and the sound of rustling fabric announces Jack Lander's return to the cockpit. "Man, I thought you'd never get back," Randy says without looking behind him.

"Sorry, man," Lander replies. "Had to hit the head something fierce."

"Too much vino," Randy says with a laugh. "Look, I'm going down to have a smoke." He stands, preparing to climb from the plane.

"Whoa, amigo," Lander says, pointing forward. "What's that blinking on your panel?"

Randy looks down and inspects his instrument panel. Sure enough, a small light is now pulsing with an intermittent amber glow. The light sits above and slightly left of the dial he has been spinning. The word ARMED is etched below it.

The young airman frowns. What could be wrong? "Better get the techs," he says, and clambers down the scaffold beside the plane to find a member of the support crew.

He returns quickly, followed by a gruff maintenance sergeant. They mount the scaffold and stand beside the cockpit. Randy points to the blinking amber light. “Huh,” says the old noncom as he leans into the plane. “Pardon my language, sir, but you guys ain’t been dicking around with the switches, have you?” He asks in a deep, rumbling drawl.

“No, Sarge,” both men pipe, almost in unison. “I guess I could have hit something climbing out of the cockpit,” Randy adds.

“Electrics is funny,” the sergeant says, talking mostly to himself. He has been maintaining military aircraft for more than two decades. “These beasts are as much computer as airplane. Sometimes things turn on all by themselves.”

The sergeant makes a decision. “Get out and stand away from the plane, gentlemen,” he tells the fliers. “I’ll turn off the cockpit circuits and restart them. That should resolve any transient current problems.”

The two pilots hurry down the scaffold and walk to the smoking area beside a nearby maintenance shack. Randy reaches into his flight suit for a cigarette and offers one to Jack as well. His GIB is visibly disturbed. “Jesus, Randy,” he whispers. “Did you see where that light was?”

Randy shakes his head in firm denial. “Look,” he says, “if that old sergeant wasn’t upset, then I’m not either. It’s like he said, just some transient current going through the panel. Maybe a bad fuse. Hell, it could be a million things.”

“But the dial …”

Randy cuts him off. “Everybody spins that dial,” he whispers harshly. “Everybody! Do you know the odds? You’ve got more chance of winning the fucking Italian lottery than …”

Their discussion is interrupted by the angry, gravel-crunching sound of approaching boots. The old sergeant reappears, flanked by a captain. Four armed men wearing white helmets and Air Police brassards follow behind. The group stops in front of Randy and Jack.

“Lieutenant Simms,” the captain barks, “you are detained.” He turns to the AP closest to him. “Escort this officer to the detention area. Lieutenant Lander, you are not detained, but you will remain in this area until further notice.”

“What is the charge, sir?” Randy asks as the APs surround him.

“Hell, we won’t know till it’s all over,” the captain replies, shaking his head. “For now, let’s call it misuse of government property. That should work.”

“Can’t you figure it out, son?” The sergeant says softly. “You hit the numbers. The bomb is armed. We got a NAICAP on our hands.”

Some would call Randy Simms lucky. This afternoon his luck has twisted savagely from good to very, very bad.

Chapter 2: Acronyms

The military loves acronyms. NAICAP—Nuclear Accident (or) Incident Control Action Protocol—is a good example. The strung-together words barely hint at the mountain of activities that begin to occur immediately when a nuclear incident is reported, circa 1965.

First and foremost, all nonessential people must be evacuated from the danger zone, and the area must be fully secured. In a practical sense, this is impossible at Aviano. The base is surrounded by farms and villages. In 1965, telephone service is spotty at best in rural northern Italy. Cell phones are three decades in the future. Those desiring a private phone must pay all expenses to set up a land line, including the cost of the telephone pole itself. When the base has an alert, helicopters with loudspeakers must be flown around the Po Valley, shouting the news to service members living away from the facility.

A full evacuation would mean door-to-door announcements, delivered to every house along the myriad winding roads and paths of the valley. It would also require reporting the problem to the Italian Army, which maintains a tank training facility immediately beside the air base. It's rumored that the Italians are there to make sure no combat missions are flown from Aviano without their consent. Indeed, a quartet of AMX tanks is positioned to face the base's runway right now. No, evacuation won't happen—at least not right away.

Other activities are taking place. Word has been flashed via ultra-secure troposphere scatter radio to U.S. Air Forces Europe Headquarters (USAFE) at Ramstein Air Base in Germany: NAICAP is in effect. From there, the message will be relayed to the Pentagon, and to DASA—the Defense Atomic Support Agency, the part of the Atomic Energy Commission that deals with military matters (the Department of Energy won't be established for twelve more years). DASA will immediately forward the news to Sandia Labs, in the shadow of mountains at

the edge of Albuquerque, New Mexico. A NEST (Nuclear Emergency Support Team) will be formed there and transported to Aviano as rapidly as possible.

Meanwhile, NATO strike forces must realign. The removal of the Aviano aircraft from operational status has left a gap in western Europe's defenses which must not persist. Planes from Spangdahlem Air Base in southwestern Germany are brought online to replace them temporarily. Some of these may be West German Luftwaffe F-104's, armed with U.S. nuclear weapons under U.S. supervision.

Other shifts take place. Mace cruise missiles at several clandestine European sites get target changes. Mediterranean submarine patrol vectors are subtly altered. Electronic recon planes based in Germany and Turkey are directed to "snoop" the edges of the East German and Soviet airspace, looking for any unusual military activity. The evolving incident at Aviano causes hundreds of soldiers, airmen, and sailors at locations across Europe to work through the night.

A breach in nuclear command-and-control security must be corrected. A war code has been compromised. As a result, the war codes for all U.S. nuclear weapons in Europe must be changed. In 1965, the codes are kept in sealed wafers, called "biscuits" or "cookies," issued to flight crews of aircraft carrying nuclear weapons. The biscuits are hard plastic with clear inserts. They are color-coded—red for actual war codes, black for practice use. Upon receiving an EAM (Emergency Action Message), a pilot will break open his biscuit and extract the code, which is printed on a card within. If that code matches what he's received in his EAM, he must use it to activate his PAL device and perform his stated war mission. When not in use, the biscuits are kept in high security safes. Only those with top secret clearances are even allowed to touch them.

Now, until all the codes can be reworked, and all the biscuits redistributed, control of NATO's nuclear deterrent is in jeopardy.

On the supposition that Simms or Lander (or both) might be enemy agents, the FBI is notified. An immediate investigation of each man is launched. Randy's family is interviewed in Rye, New York, as are Jack's parents in nearby Mamaroneck. By noon the next day, every teacher, sports coach, girlfriend, or other social contact these young men have ever had will have been identified, located, contacted, and interviewed by polite men in dark suits. Some will be marked for further surveillance. All will be puzzled.

At Aviano, the officers in Randy's unit, from squadron leader down, are assembled and interviewed by OSI (Office of Special Intelligence) security agents. All of both men's personal property is impounded and searched, methodically and thoroughly. Their quarters are "swept" to discover any hidden electronic equipment. Detailed notes are compiled about where the men have spent their off-duty time, which bars and restaurants they frequent, and any locals either of them keep company with. Aviano's current mayor is a Communist. Although the Italian flavor of communism is as different from the Soviet variety as light pasta is from borscht, the concept of conspiracy can't be overlooked. Nothing can be overlooked.

Finally, a tarp must be raised to conceal all activity around the Phantom II from prying eyes above. Since 1961, Zenit photo-reconnaissance satellites have regularly passed over Aviano. Though the Soviets try to mask their purpose by calling them "Kosmos" and blandly describing them as "scientific," the military are not deceived. By the time they are finally phased out in 1966, Zenit satellites will have become the most ubiquitous objects put in orbit by man.

Once all the steps that can be taken are underway, the most important work can begin: the attempt to defuse the nuclear bomb on Aviano's flight line.

Chapter 3: Three Visitors

The detained alert pilot sits by himself in a windowless grey room in the Base Provost Marshal's building. The room contains a cot, but he is too upset to rest. Instead, Randy remains seated at the metal table nearby, finishing his last cigarette. He has no idea where Jack might be, but guesses his GIB is somewhere close by. Randy has already been interviewed by the captain who detained him (mostly to fill out paperwork), and by his squadron leader, Major Tanner. Neither would say anything about what's going to happen to him. He asked the major if he could call his dad.

"There's no way," Tanner replied.

"Please …"

"Randy, it can't be done. Not right now. It doesn't matter anyway. He can't help you. Not with this. I can't help you either. You're in big trouble. Giant trouble. You are going to have to ride this one out on your own." He shook his head sadly.

A long, uncomfortable silence followed. "It's not fair," Randy finally murmured.

"You can't think like that," Tanner cautioned. "It won't help you."

"We all did it. You know that sir. We all spun that damn dial," Randy continued, his voice rising, tears forming in his eyes. "It could have been any of us. Anybody. Even you."

Tanner sighed and looked away. Randy's father is both a friend and an important customer for his insurance agency, back in Westchester. "Yeah," he said quietly, "Even me." He rose and left the room. Since then, Randy has remained sitting at the metal table—alone with his thoughts.

Now, those thoughts tumble through Randy's mind like small animals caught in a cage. He clings to one belief. He's sure his dad will help him get through this awful situation, just like

he did with the DUI several years back, or with that trouble at the frat party when he was in college. Once he's past this shit storm, he decides, he'll get out of the Air Force. He'll go to work for his father, just as both had planned. He pushes the fear about what might happen otherwise out of his mind—but it keeps returning.

Randy's father is wealthy and powerful. "Rockin' Randall" ("Rock on over to Randall, roll out in your new drive!") owns seven new car dealerships, more than a dozen used car lots, and a string of tire stores as well. His businesses dot upstate New York and neighboring Connecticut. They employ almost a thousand people. He plays golf with the governor on a regular basis. Most of New York's congressional delegation owe him favors. Randy is sure his dad can make all this mess go away.

In the hush of the dim grey room, Randy imagines how it will be. He'll start as a salesman, of course. Soon after that, when he's shown what he can do, he'll be given a dealership to run—maybe the Dodge store in Newburgh. That would be his choice. He smiles. Sure. He'll get a little place of his own, not too close to home …

Muttering in the hallway shatters his reverie. Harsh neon light invades the room as its door swings open again. Randy has never seen the man who enters before. He wears a dark blue work uniform with the silver oak leaf of a lieutenant colonel on his collar. He is about Randy's height, trim, sallow complexion, intelligent brown eyes. His short, greying hair betrays his age: forty-something, a lifer for sure. The man seats himself at the table, facing him. The name plate on his breast pocket says CASSINO. Randy stiffens in his chair.

"Lieutenant, do you know who I am?" The voice is low and even. There's an accent. New York City?

"No, sir."

"I run munitions at this base. I'm in charge of the bomb you just activated. It's my job to turn it off. Do you understand?" As he asks his questions, the man stares intently at Randy, as if trying to catch the young airman's thoughts before they're spoken.

"Yes, sir. Colonel, could I have a cigarette? I'm out and …"

"Ask the guard when I go," the man interrupts. "I've only got a few questions. Did you handle the bomb itself in any way today? Did you kick it, or step on it?

"No, sir. I …"

"Just listen. You spun the PAL dial, right? How often? How long?"

There's no reason to deny it now. "I don't know. Maybe a few dozen times. I was waiting for my GIB to get back. Maybe five, ten minutes."

"OK. How long before you noticed the flashing light? Think hard. This is important."

"It couldn't have been long—a few seconds, no more. Jack saw it before I did. It went off while I was getting out of the cockpit to go for a smoke."

The man rises at once and rushes from the room. Randy blinks, surprised at how fast the old lifer moved. The awful gravity of his situation has finally begun to sink in. Suddenly, he's very scared. He buries his head in his hands and moans.

Chapter 4: The Bomb

The men find Cassino at the base golf course. Despite the weather, he and his son are hitting practice shots at the driving range. The searchers pull up in a dark blue Air Force four-door truck. The driver keeps the vehicle running while the lieutenant beside him slides quickly from his seat and runs toward the pair, leaving his door open.

"Colonel Cassino," the lieutenant says breathlessly, saluting. "Sir, you'll have to come with me. There's been an incident on the flight line. One of the alert planes. I'll brief you further as we drive."

"See that my son gets home," the base's chief of munitions tells the young officer. He faces his youngest son, who has recently turned seventeen. "Make sure your sisters are home," Cassino tells him, holding his shoulder. "Tell your mother to keep everyone in the house."

He looks directly into his son's eyes. "Do you understand me?" He says with great intensity, then turns and hurries to the truck.

As Cassino settles into his seat, the truck begins to move. The lieutenant turns to speak to him. "It's one of the alert planes, sir," he says. "The pilot hit the PAL code. By accident, we think."

"Biscuit broken?"

"No sir."

"Are we sure the bomb is armed?"

"Yes sir, there's no mistake. We've already reported the NAICAP to Ramstein."

"OK. Make sure all the plane's power is turned off. Get me to the flight line, but first I need to see the pilot." Cassino says nothing more. Deep in thought, he tries to remember all his knowledge about the weapon under the alert plane—a bomb which could be ready to detonate.

Lieutenant Colonel Dan Cassino knows the B43 thermonuclear bomb well. His resume as a nuclear warrior is both extensive and spotless. If a person were to be hand-picked to address the situation in Aviano, Cassino would be a prime candidate for the job. As the truck hurries him to the flight line, he concentrates, trying to focus his experience to develop a strategy for disarming the bomb.

The B43 has been in production since 1959. Almost two thousand are operational by 1965. It is used by virtually every nuclear-capable aircraft in the U.S. Air Force and Navy inventories. Its appearance is much like any other bomb: a tapered cylinder a foot and a half in diameter and roughly thirteen feet long, with four sleek fins at its rear. It weighs about a ton and its "dial-a-yield" settings can be altered to deliver explosive power ranging from seventy kilotons (seventy thousand tons) to a full megaton (one million tons) of TNT—more than enough to destroy a Bulgarian armored column, or to close the Brenner Pass. This particular bomb is set to deliver a seven-hundred-fifty kiloton blast, which will devastate the Po Valley if Cassino and his team cannot disarm it.

Like all thermonuclear weapons, the B43 is actually two bombs, not one. The first bomb—the primary—is called Tsetse, after the small but deadly African fly. Tsetse has replaced the less reliable Python primary used in the past. It is a nickel-plated egg under ten pounds in weight, composed mostly of plutonium and uranium, liberally salted with tritium. When this egg is imploded by the precisely timed shaped charges around it, the resulting ten-kiloton explosion is large enough, by itself, to flatten the Aviano flight line. Small nuclear bombs like the Tsetse are used by themselves in artillery shells and anti-aircraft missiles in 1965. A similar warhead tips the Davy Crockett infantry weapon, infamous for having a blast radius uncomfortably close to its two-thousand-yard range.

The second bomb, which sits behind the Tsetse, is a rod of additional fissile material surrounded by a polystyrene-wrapped cylinder filled with lithium deuteride. The whole assembly is sheathed in radiation-reflective plutonium. When the Tsetse explodes, the rod fissions as well—triggered by radiation the primary's chain reaction generates. The rod acts as a "sparkplug," super-heating the polystyrene around it to a hellish foam while instantaneously compressing the deuterium in the cylinder to imitate conditions at the center of a star. The resulting fusion unleashes gigantic explosive power.

There's far more to the anatomy of a B43 than what is explained here. Krytrons, neutron generators, tritium reservoirs, beryllium reflector/tampers; all these and more contribute to the terrible outcome. Thermonuclear bombs are complex, ingenious devices in 1965. Coaxing more explosive efficiency out of each bomb built has become the dedicated goal of an army of engineers, scientists, and technicians, working at locations all around the nation.

If this bomb detonates, a new sun will rise from the crater that had been Aviano Air Base. The surrounding hills and mountains will reflect its destructive effects back toward the initial event, multiplying the devastation even further. Hard radiation generated by the blast will wither and kill any life that survived the shock and heat of the explosion. Because this will be a ground burst, thousands of tons of dirt and disintegrated structures, plants, and people will be thrown into the atmosphere. The heaviest particles will fall to earth quickly. The lighter particles, caught by wind, will drift toward Venice, Austria, and the Bavarian forests beyond—suspended in a giant pyro-cumulus cloud. This cloud, glowing with lethality, is rich with isotopes of cesium and strontium that need decades or even centuries to decay to bearable levels of radioactivity. In short, the Po Valley around Aviano will become an uninhabitable scar on the face of the Earth. Lingering effects from fallout will pollute and damage life for hundreds of miles around. Cancer

rates for Italy, central Europe, and the rest of the planet will increase measurably. Cassino knows this must not be allowed to happen.

As he sits in the truck, he mentally inventories possible defusing strategies. Little can be done to physically disarm the Tsetse primary, he knows. It is a "sealed pit" device—the nuclear "pit" and its surrounding shaped charges all inaccessibly lodged in their casing. Still, if the bomb's fuse was not completely activated it can be removed, its mechanism reset or disassembled, and the bomb will be safe. If.

The fusion bomb behind the primary can be disarmed in several ways, Cassino knows. Steel beads can be poured into the assembly, interfering with the fission-fusion reaction, causing it to fizzle instead of reacting completely, though deadly radiation will still be generated. In the proper environment, the whole assembly can be disassembled and rendered harmless. That will work, if the bomb can be safely removed from the aircraft and transported back to a munitions bunker, shielded from the world around it. If.

His mind races. Everything depends on the fuse. If it has not been fully activated, if the power was turned off in time, much can be done. If activation has advanced beyond a certain point, if specific circuits have already been triggered, choices diminish rapidly. Too many ifs, not enough certainty. The most important job Cassino's team has right now is to trade ifs for certainty, certainty they must act upon—quickly.

Chapter 5: Two-man Rule

As Cassino reaches the flight line, he walks from the truck to meet his team. Before interviewing the pilot, he instructed the Air Police to locate and transport two men to the flight line: Jonas Brown and Andy Gray. They are an odd pair. Brown is a very tall, very thin lieutenant with thick, prematurely grey hair, penetrating blue eyes, and a wickedly dry sense of humor. Gray is a short, stocky senior staff sergeant with more than fifteen years in the Air Force. His wry sense of the absurd is (in part) the product of his experience as an African-American in military service. Wags who know them both have developed a saying: "Gray is brown and wry, and Brown is grey and dry." Yet, irrespective of the differences between them, these two men may be the best nuclear munitions team in Europe in 1965.

By now, a cordon of Air Police has surrounded an enormous canvas tent that now juts from the revetment, shielding the Phantom, its bomb, and any activity around them from view. No one without proper security clearance and a need to be there is allowed through its perimeter. At no time is any person allowed through alone. Those who approach the bomb must do so in teams of two, both of whom must have roughly equal knowledge of its design and assembly.

This "two-man rule" is the root of all nuclear weapons security procedures. Basically, the rule assumes that at least one of the people in any pair accessing a nuclear weapon is not a traitor. If one member proves by his actions to be an enemy agent his counterpart must immediately kill him, since both members of the dyad are required to be armed. The two-man rule is in force whenever nuclear weapons are inspected, assembled, maintained, fused, moved, or handled in any way. Cassino and his team approach the cordon. Gray and Brown will initially enter the perimeter, along with a cart of tools and diagnostic equipment they have brought with them. Their commander will remain outside, waiting for their report.

Another man is already there, in vehement argument with the sergeant in charge of the cordon's security. "Let me in, dammit," he growls.

Major Harry Reiss wants to enter the perimeter. He wants to see what's going on behind the tarp. Even he is not sure exactly why. Perhaps to watch what is taking place—to know what he has not been told. Perhaps just to be able to say later on that he was there, at the center of the action.

Reiss oversees maintenance at Aviano, and he has the high security clearances that go with his job. Still, he has no proven need to know what is being done within the cordon. His name is not on the roster the sergeant in charge had been given listing people allowed through. He will not be let in.

"I'm giving you a direct order. Let me through." Reiss continues. He is a small, wiry man, well known for his bad temper. "By God, I'll see you busted all the way down," he concludes.

The sergeant stands his ground. "I'm sorry, sir," he says. "I can't obey your order. Your name is not on the roster I've been given."

"Who came up with this roster?"

"I did," Cassino says, as he approaches with his team. "What's the trouble, Harry?"

"Dan, I'm glad you're here," Reiss says, turning to meet him. "This idiot won't let me through."

"He can't, Harry," Cassino says calmly. "You've got no reason to be in there, no need to know what's going on." He turns to the sergeant. "Here's the team. Please process them through," he says.

As they tend to when he is angry, Harry's eyes bulge from their sockets. "A word, please, sir," he says harshly.

The two officers walk away from the cordon. Reiss turns to face Cassino, looking up at the taller man, hands on his hips. "This is my flight line," he begins.

"Glad you brought that up, Major," Cassino interjects. "We'll need it evacuated. Completely. Except for the maintenance crew working the alert planes and the men in the tower. Right now. ASAP."

"What the hell are you talking about, Colonel? You can't tell me to evacuate the whole damn flight line. I've got lots of work going on. Important work! There's two engines …"

Cassino interrupts. "I just gave you an order, Major. Carry it out or call up Colonel Lisle. He'll give you the same instructions. Do it quickly, though. We may not have a lot of time."

"What the hell is going on?"

"I don't intend to tell you, Harry. Not yet anyway. I can tell you it's serious. Look, I can't discuss this further." Cassino turns and walks quickly back toward the security cordon. He can't share his knowledge of the unfolding situation with anyone outside his team, having been ordered not to disclose it.

Harry walks away also, puzzled as before and now worried as well. He decides he will call Colonel Lisle, the Aviano base commander. He intends to tell him that evacuating the flight line was his idea, and that he's already been hard at work on it. Maybe Lisle will tell him what is going on. Feeling a little better now, he hurries to his office on the other side of the runway.

Cassino stands outside the cordon, watching Gray and Brown examine the bomb—which still hangs from beneath the Phantom's fuselage. Communications with the DASA NEST have been established. The NEST is already on its way to Aviano, crossing the Atlantic in a military

passenger jet. Their ETA (expected time of arrival) at Aviano is still five to eight hours off, because they have to stop in Germany to refuel and get a new pilot. In the meantime, they advise against any attempt to unload or move the B43 until it has been determined whether the bomb is fully activated, or how far the arming sequence has progressed. If the bomb is fully armed, any movement might be enough to detonate the fuse and cause the explosion no one wants.

The men from Cassino's team crouch beside the bomb, listening. Each has a stethoscope-like device, which they place on the bomb—about three feet from the tip of its nose.

"Hear that?" says Gray. "Something's moving. Rotating, sounds like."

"That's the fuse, for sure," Brown replies. "It's cycling, looking for the programmed altitude. We need to tell the Colonel."

As the men rise and walk back to the cordon's perimeter, Cassino is reporting the situation to Colonel Lisle, who has just arrived.

"… may not be fully armed. Everything was turned off immediately when the sergeant saw the cockpit indicator flashing. If the arming cycle has not continued, we're in good shape, sir."

"If that's the case, what's your next step?" Lisle asks.

"If the bomb's not armed, we will safely remove it from the plane, get it back to a secure area, and disassemble it. We won't have to wait for the NEST to get here." Cassino says. "No sweat, sir." He looks behind him, at the men approaching. "We'll know now," He says, and walks toward them.

As they draw closer, Brown salutes. "What have you got, Jonas?" Cassino asks, returning his salute.

"There's definitely something going on in there, Colonel," Brown says. "Sounds like the fuse is cycling."

"Sergeant Gray, do you concur?" Cassino asks.

"Yes sir, I do. The sound was unmistakable."

"Ah, horseshit," Cassino mutters. He turns to his team. "We need to know if the bomb is on internal power," he says. "If it is, all bets are off. It's completely armed. If it's not, we can still remove and secure it."

"How will we …" Brown begins.

"Only one way, sir." Gray says.

"Is all the airplane's power off?" Cassino asks. "Are we sure?"

Both men nod.

"Then here's what we'll do," Cassino continues. "Sergeant Gray, you come with me. We're going to pull the umbilical cable that attaches the bomb to the airplane's electrical power. If there's no arc, that means the bomb is still using the airplane's power, which has been turned off. So, it's not fully armed and we can move it."

"If it arcs?" Brown asks.

"If it arcs, that means the bomb is on internal power," Gray explains. "That means the bomb is fully armed, ready to detonate."

Cassino and Gray walk toward the cordon's brightly lit perimeter. The sun is beginning to set. The men cast gigantic, impossibly long shadows on the tarmac.

Chapter 6: La Familia

More than four million Italians immigrated to the United States between 1890 and 1920. It was a time of trouble for Italy, as it coalesced from a patchwork of dominions to a single nation and then staggered through a disastrous world war. Dan Cassino's ancestors were among those who left. His grandfather, Franco, was exiled from his home—along with his brother and several other men from the village of Cassino. All were victims of the outrageous tyranny of trigamist Francesco Crispi. The men were interned in the Dolomites, near starkly beautiful Lake Garda. They could not return home, for fear of reprisal and imprisonment. Instead, they made their way to the (then) Austro-Hungarian port of Trieste, where they took passage to the new world. Their sea journey ended in Philadelphia's harbor. The men of Cassino were processed by U.S. immigration there, in 1892.

Dan Cassino's surviving relatives have no clear idea of what the family's name was in Italy. Some say Miele, while others point to the more populous Pittiglio clan. Misunderstandings or sloth on the part of the immigration authorities, plus the destruction of many Cassino town records during World War II, have left the question unanswered. It was not unusual in those days for clerks to give the same last name to several immigrants at a time. The people in line, unable to clearly understand what was being asked and afraid to question or argue, accepted their new appellations largely without comment.

In one apocryphal family story an immigration clerk attempted to ask Franco his name, but his broken Italian was misinterpreted. Understanding the man to say he needed to know place of birth, the family patriarch is said to have thundered, "We are all men of Cassino!" to the hurrahs and applause of those in line with him. In any event—whatever he had been called

before—Dan Cassino's grandfather and the men who shared his journey had the same last name once they came to America.

Franco and his brother Bruno settled near Clark, New Jersey, where they jointly operated a vegetable farm. Had they remained there, in time both would have become wealthy men—as the towns around them grew to cities and increased the value of their land. It was not to be. After a few years, the brothers quarreled. Franco moved to New York City, where he married and had children. His son, Frank, was Dan Cassino's father.

Cassino was born in Corona, in the New York City borough of Queens, in 1920. He spent his childhood there, part of a mostly Italian-American and Irish-American population. Much has changed in Corona since then. Today, the area is largely Hispanic, with sizable middle eastern populations as well. A visitor looking to find—for example—the former apartment of Cassino's spinster Aunt Clemmie (who taught in New York City public schools for more than forty years), would do well to hire one of the many street kids around to watch his car. Otherwise, he might find it much changed for the worse upon his return.

The boy grew to adolescence as the roaring twenties collapsed into the great depression. His family suffered privations but proved resilient. They managed to cope with the pervading despair and poverty of the time. He did well in school and discovered a talent for basketball. Tall and slim, Cassino led his Elmhurst High School teams, and even found a berth in the local semi-pro league. He attended St. John's University and there received his degree in chemistry in 1941. He took a job with the Metropolitan Refining Company in Long Island City—just in time to be inducted into the burgeoning U.S. Army in May 1942.

The army did not give the new soldier much time to reflect on his changed fortunes. After completing basic training, he was sent to Edgewood Arsenal for three months of chemical

weapons instruction. Immediately after that, Cassino attended Air Corps Officer Candidate School in Miami, Florida. The training there was difficult. In addition to drill and classwork, cadre officers methodically pushed and harassed candidates—testing their will to succeed against the sometimes-arcane regulations they encountered. Every aspect of each candidate's quarters was rigorously inspected daily. A dead bug under a bed during morning inspection became "wildlife in area," grounds for enough demerits to prevent a weekend pass. Clothing out of line in a locker, floors not polished until they gleamed, beds not made so tautly that a quarter would bounce on them, and thousands of other seemingly minor and inconsequential details became the basis for weekend disciplinary marches around the quadrangle.

Cassino shared these tribulations with his roommate, who by the luck of alphabetical order was another young Italian-American. He and Bob Casaburi became close friends though these excesses in minutiae. In one incident he liked to remember, Cassino described a leak that persisted in the faucet of their room's sink. No amount of tightening could eradicate the steady drip, which always cost the men demerits. After much frustrated effort, Cassino decided to stuff the faucet with enough paper to finally stop the leak. The strategy failed. The inspecting cadre officer knew the leak should be there, as it had been since his first class had gone through training. He turned the sink's spigots as far as they would go. Sure enough, the water came—along with all the paper that had held it in—a jet of water that soaked the inspector's uniform. There were plenty of demerits for both men that evening.

When they were commissioned as second lieutenants, both Cassino and Casaburi wore beautifully cut, hand-tailored uniforms paid for by a horse. Before their last weekend pass, a member of Casaburi's family gave him a tip. "Eighth race at Hialeah on Saturday, bet the third horse—Circumspect," he was told. "Bet him to win."

This kind of advice was like gold, since members of Casaburi's family had certain connections in New York City. The betting odds against the horse were eighty to one. Only one obstacle stood in their way: the bet had to be made at the racetrack, which was off limits to officer candidates. Weighing the risk, Cassino and Casaburi decided to go anyway. Saturday afternoon found the roommates placing their bets for the eighth race—only to be confronted by their cadre officer.

"You men are off limits," the officer said. "I'm going to have to report you. You're both liable to lose your commissions."

"I know we're wrong," Cassino said. "We were given a tip too good to pass up."

"I'll tell you what," the cadre officer said. "Give me the tip as well. If I win, I never saw you. If I lose, you're on report."

Luckily for all involved, the race went exactly as expected. "Those uniforms," Cassino reminisced many years later, "they were silk-lined. Beautiful."

Both men were commissioned second lieutenants in January 1943— just two out of thousands of "ninety-day wonders" desperately needed to fill the army's ranks after general war exploded on two fronts. Cassino's aptitude test scores were high—too high, it turned out, for pilot training. Instead, he was sent to navigator instruction in New Mexico, and from there to crew training on the "hot" new B-26 Marauder. During his navigator training, Cassino met and married his first wife—Catherine—in Avon Park, Florida.

Through it all, and the combat that followed, Cassino and Casaburi kept in touch with each other. More than a year later, flying over the Mediterranean while providing air support for the invasion of southern France, Cassino watched with alarm as Casaburi's plane—hit by flak—caught fire and crashed into the sea. No parachutes were seen. The crew was lost in action.

Chapter 7: The Flying Prostitute

Some called it “the flying prostitute,” because its short wingspan showed “no visible means of support.” Others called it “the widow maker” for the same reason. Viewed from any angle, the B-26 Marauder was a remarkable airplane. Sleekly streamlined, it carried its crew of seven at almost three hundred miles per hour— nearly a hundred miles per hour faster than Hitler’s vaunted “schnell bombers” of the previous decade. More than five thousand saw combat service with the U.S. Army Air Corps in World War II.

Observers of the era would have called the Marauder a big airplane, since it was almost sixty feet long. Yet, compared to the F4 Phantom II Cassino would encounter later, its credentials were puny. Both aircraft were roughly the same length, but the Marauder carried only two tons of bombs into battle, while the Phantom could carry twice that amount—at more than twice the speed of sound. Twenty years was all the nation would need to vastly improve the efficiency of its killing machines.

By the time Cassino began his crew training at MacDill Field in 1943, pilots were no longer struggling with the unnerving idiosyncrasies of the B-26. The plane landed fast—much faster than new pilots trained on more forgiving aircraft were used to handling. If landing approach speeds were allowed to drop much below one hundred fifty miles per hour, Marauders could stall and plummet from the sky. Earlier in the year, more than a dozen Marauders had crashed in just one month, leading to the bitter refrain, “One a day in Tampa Bay.” Distressed wives and mothers got word to Senator Harry Truman, who at that time ran the powerful Senate Special Committee to Investigate the National Defense Program—also known as the Truman Committee. The future president promptly summoned Glen L. Martin, head of the company that made the Marauder, to Washington.

"Why are these crashes occurring?" Truman asked Martin.

"The wings are too short," the aviation pioneer answered truthfully. "They need to be six feet longer."

"Why not fix them?"

"The production lines have been set up. It would be a lot of trouble," Martin is said to have explained. "Besides, I already have a contract."

Truman's response may have been much saltier than what was recorded. "Then I'll cancel your contact, and see that you don't get another," he is reported to have said. Miraculously, within months, B-26's with longer wings began pouring off the assembly lines. This and other modifications, along with more pilot familiarity, ended the rash of accidents—but the bomber would remain a demanding plane to fly. Even so, it ended the war with the lowest attrition rate of any U.S. combat aircraft.

The training at MacDill was designed to get crew members familiar and comfortable with the aircraft and their combat jobs, and also to get them used to operating in a crew—as part of a combat unit. Flights to other bases in the south and southeast were a big part of the training. In photos taken then, Cassino can be seen in his army pinks and greens having cocktails with squadron-mates and crew members while on some of these training missions. He seems relaxed and amused in these snapshots, as if mildly excited about what is to come.

Training completed, after some much-needed leave, Cassino left Florida on a series of flights that took him first to British Guiana, across the Atlantic, and then over the North African desert in November 1943. Eventually he arrived at his destination: Decimomannu, Sardinia, just north of Caligiari. This was the new home of the 320th Bomb Group, known to those who were based there as "Decimo." Their new home had previously been a German Luftwaffe base, and

remnants left by the previous tenants could be found everywhere. The group had already fought its way across North Africa, and now stationed its crews in a canvas village of tents that stretched across the gentle valley around its airdrome—since Allied bombs had recently destroyed most of Decimo's structures.

Cassino was sent to the 441st Squadron, as the navigator of aircraft tail number twenty-three. Named "Thumper II" by its crew, the bomber sported a whimsical picture of the rabbit from Disney's "Bambi" as its nose art. He was assigned to a six-man tent, drew his supplies, and settled in. Cassino's war—and his first journey to the country of his ancestors—had begun.

Chapter 8: In the Meantime

As Cassino left for Europe, events were taking shape that would have tremendous on impact his future—and on that of the world, as well. Under the leadership and scrutiny of General Leslie Groves, secret cities were being built to bring to reality what until now had been speculative fiction: the power of the atom directed to war.

By the dawn of the twentieth century, both France's Jules Verne and Britain's H.G. Wells had written about atomic energy and its use as a weapon. Other science fiction writers wondered about the enormous force that powers the sun itself as well. These were all literary fantasies. By the 1930's, fantasy was giving way to fact.

The discovery of the neutron in 1933 led Polish theorist Leo Szilard to envision the possibility of a nuclear chain reaction—a full five years before nuclear fission was actually achieved. He worked with Enrico Fermi to prove the concept, using uranium in a "pile" of graphite bricks near Chicago, in 1938. The implications of their research were clear. The power of the atom could potentially be released destructively, as an explosion of enormous power.

Fearful that Germany was investigating such a super weapon, Szilard and other like-minded physicists convinced Albert Einstein to write a letter to President Franklin D. Roosevelt, explaining the danger to him. The result eventually became known as the "Manhattan Project," since it was funded from the Manhattan District of the Army Corps of Engineers. The objective of the program would be to win the race for nuclear weapons against the Nazis.

Under the direction of Robert Oppenheimer, a group of the nation's most gifted physicists and engineers was sequestered at what had been a remote New Mexico dude ranch. Their theoretical conclusions would be replicated on a grand scale at enormous facilities in Tennessee and Washington. In Tennessee, banks of gigantic centrifuges laboriously separated

fissionable uranium from raw ore, steadily refining a rapidly shrinking amount until only a tiny, sufficiently pure remainder survived. Even this huge effort proved insufficient, until paired with Ernest Lawrence's calutron, which produced enough uranium to construct the first nuclear bomb delivered in anger—Hiroshima's "Little Boy." (The Hiroshima bomb was never tested. Its simple uranium "gunshot" mechanism was deemed fool-proof. All the bombs that followed used a far more elegant implosion mechanism, first tested successfully in the New Mexico desert. Initially, scientists thought a similar bullet/target mechanism could work for plutonium as well as uranium-fueled bombs. The result was the abortive "Thin Man" design, which was found to be incapable of reaching critical mass without the danger of pre-detonation "fizzle." Instead, the "Fat Man" implosion design prevailed—as it has to this day.)

At the same time, a brand-new city was under construction on the banks of Washington state's Columbia River. The Hanford facility took Glenn Seaborg's table-top experiments from 1941, and duplicated them on a gargantuan scale. Processing factories more than nine hundred feet long and sixty-five feet wide would refine tons of uranium into a few pounds of precious, fissile plutonium. They'd be fed by huge reactors, turning out slugs of uranium—each of which might hold a teaspoon or so of the desired end product. Hanford would become the nation's primary production site for nuclear bomb materials—the origin of fissionable materials for Nagasaki's "Fat Man," and the tens of thousands of devices that have followed.

All the while, the greatest minds available in physics joined engineers and technicians at the obscure ranch near Los Alamos, New Mexico. Here, under heavy security and relatively primitive living conditions, the men and women selected strove to develop a workable bomb to deliver the uranium and plutonium being produced. Their objective was to produce a bomb to

atomize Berlin, before Nazi technology could field a device to destroy London—or even New York City.

Even though the Allied effort was born from fear of a Nazi atom bomb, in truth the German effort was never productive. Begun in 1939, the *Uranverein* (Uranium Club) or *Unranprojekt* never progressed much beyond the laboratory level. Total funding until work ceased in 1945 totaled eight million reichsmarks, roughly $2 million. In comparison, Manhattan Project funding exceeded $2 billion (more than $24 billion in today's dollars), and required half-a-million workers—almost one percent of the entire U.S. workforce at the time.

Many of Germany's best minds in physics contributed to the Nazi effort, including Werner Heisenberg, Otto Hahn, Walter Bothe, and Kurt Debner. Even so, by 1942 it was assessed that nuclear fission would not play a meaningful part in Reich war plans. The program continued with minimal funding, under the supervision of the Reich Research Council (*Reichforschungsrat*). In a postwar interview, Nazi Minister of Armaments Albert Speer recalled being informed that nuclear weapon development would be "impossible" before 1947 at the earliest, and even then, only with massive redistribution of scarce resources.

A dissenting opinion has been published more recently. In his 2005 book, *Hitler's Bombe*, German historian Rainer Karlsch presented evidence that a team of scientists under the leadership of physicist Kurt Biebner successfully tested an atom bomb on the island of Ruegen in late 1944, and again in Thuringia in 1945. Karlsch wrote that seven hundred prisoners died from the tests, although no evidence of radiation at either site has been detected.

On the other side of the planet, Nazi Germany's axis partner also investigated nuclear weapons. Two separate programs were undertaken, "B-Research" under the supervision of the

Japanese Navy and the Ni-Go Project under the Army. Both strove to refine uranium to sufficient purity for atomic weapons use.

"B-Research" saw a cyclotron purchased prewar from the University of California-Berkeley lead to development of more powerful units at Tokyo's RIKEN Institute. Still, reports collected after the end of hostilities indicate sufficient quantities of fissionable materials were never collected. Eventually, attention was redirected toward radar improvement.

The Japanese Army's Ni-Go Project sought to refine needed uranium chemically, using a Clusius Tube. Dr. Yoshio Nishida and his team received more than half a ton of unprocessed uranium oxide from the Nazis by submarine, but were unable to distill sufficient quantities of uranium hexafluoride from it before their facility was destroyed by U.S. bombing.

In October 1946, the *Atlanta Constitution* published an account of a successful Japanese nuclear test—conducted near Hungnam, Korea before the town was captured by Soviet troops. The reporter, David Snell, later amplified his statements in a 1985 book (*Japan's Secret War*) by David Wilcox. The book was expanded and reissued in 2019, despite refutation from the U.S. Department of Energy.

The Soviet Union also developed an interest in the possibilities of nuclear explosives as world war commenced. Georgy Flyorov, a physicist serving in the Soviet Air Force noted the sudden cessation of papers on nuclear science from Germany, Great Britain, and the United States after 1940. Certain that this sudden void was due to secret research, he wrote two classified letters to Stalin himself, warning of the consequences of ignoring atomic weapons development. If research was not begun, Flyorov wrote, "the results will be so overriding it

won't be necessary to determine who is to blame for the fact that this work has been neglected in our country."

After reading Flyorov's letters, Stalin reassigned scientists and authorized work to build an atomic bomb in 1942, initially under the direction of physicists Anatoly Alexandrov and Igor Kutchatov. Although Kutchatov remained doubtful about the possibility of nuclear explosives, theoretical work on a plutonium bomb continued through 1945, based on espionage gained from British sources.

Following the successful detonations of U.S. atomic bombs over Hiroshima and Nagasaki, the pace and concentration of Soviet efforts accelerated dramatically. Stalin appointed his brutal henchman Laverentiy Beria to oversee the project. Less than a year later, in October 1946, the first Soviet nuclear reactor was completed and made operational.

The reinvigorated program drew heavily on intelligence gained from infiltration of the German and U.S. nuclear weapons programs, as well as the services of captured German scientists and technicians forced to work for the Soviets. By the end of 1945, rough blueprints of both the "Fatman" and "Little Boy" weapons were in hand, and U.S. decisions made concerning plutonium production were followed, saving valuable development time. The 1945 Smyth Report on the Manhattan Project was quickly translated into Russian, becoming a valuable resource.

British spy Klaus Fuchs provided vital technical information to brilliant physicist Andrei Sakharov and his team, though they weren't privy to it until sometime after the espionage occurred. Once aware, these men were able to successfully develop a working Soviet bomb—only four years after the U.S. Trinity test.

After fits and starts, doubts and misgivings in laboratories and projects in several nations, the nuclear genie was released to the world. The biggest unknown was revealed to mankind on July 16, 1945, in the New Mexico desert—the reality that a nuclear bomb could be built. A new kind of soldier—a nuclear warrior—was now needed to maintain and deliver these terrible weapons. Fate would bring Dan Cassino into their ranks.

Chapter 9: Bridge Busters

An inveterate bridge player, Cassino kept a terse diary of the missions he flew from Decimo in a pocket-sized score pad. The first mission listed in it were the railroad bridge and marshalling yards at Arezzo—a town south of Florence (for a list of all Cassino's World War II combat missions, see Appendix A). By the time of his arrival, the 320th had already flown more than a hundred bombing missions since its initial strikes from Algeria. The group was well on its way to earning its reputation as a premier bridge busting force (most of the missions Cassino would fly targeted bridges or the yards surrounding them). The weather conditions, in the parlance of the day, were CAVU (ceiling and visibility unrestricted). No flak or enemy aircraft were encountered. All thirty-four bombers that got to the target returned safely. The Marauders took off just before nine in the morning and were landing back at Decimo a little before two in the afternoon. It was a perfect example of the kind of mission Thumper II's crew called a "milk run."

Even so, it is impossible to overestimate the emotions and stress that act on anyone during a first journey into battle. Certainly, fear and anxiety loom large, and these sentiments are not limited to concerns about personal harm. Dread of somehow making a terrible mistake—an error or omission that might cause injury or loss of life to someone else—also weighs on an untested warrior's mind. The potential embarrassment of looking foolish or stupid to crewmates is there as well. Add to all this the innate resistance most people share against taking the lives of others, and it seems remarkable that nations can raise armies to make war at all. Yet they do. The best and most promising have always answered the call of patriotism and duty to serve, even though the experience may change and scar them forever—if they survive.

Cassino would fly five more missions during December, including two targeting the marshalling yards outside Pisa, one of them on Christmas day. His first mission to the railroad bridges of Orvieto occurred on the 28th. He would return to bomb them again twice more.

Orvieto is a small, beautiful Italian city on the Umbrian plain, north of Rome. It has been continuously inhabited since Etruscan times. The city is renowned for its white wines and its truffled pasta. Tourists still come to see its underground passages, carved from native volcanic tuff, which wind for miles beneath its streets. During World War II, a pair of railroad bridges spanned the Paglia River near Orvieto—one to the north, the other to the south. The 320th and other Allied units would bomb these bridges more than twenty times between 1943 and 1944, since they were crucial to German supply and troop movements. "They never bothered us much when we bombed the south bridge," Cassino would remember decades later, "but north Orvieto was real trouble." Heavy antiaircraft fire and enemy aircraft attacks dogged the crews unlucky enough to be assigned to hit the northern bridge.

In his pocket log, Cassino wrote of his January 15th, 1944, mission: "Roughest raid yet. Plenty of flak and attacked by fighters. What a day." Among all the missions he flew during World War II, those to Orvieto were seared most deeply into Cassino's memories. After returning to Italy decades later, he drove from Aviano to the banks of the Paglia several times, just to look again at the bridge that caused him and his old unit so much hardship.

From his seat behind the pilot, Cassino watched history unfold. He saw Allied forces liberate Rome. "Saw invasion of Rome today," he wrote. "It sure looked good." He flew above the anguish of the Anzio beachhead. His plane took part in the invasion of southern France and attacked the coastal artillery batteries near Toulon. Bridge after bridge, town after town fell under his bomber's wings. In March, Cassino had a rough sort of homecoming—though any

relatives he may have had in the area surely did not welcome his arrival. On March 15th he flew in the mission that bombed Cassino, his family's ancestral home.

The town of Cassino sits in a valley at the foot of Monte Cassino and Monte Cairo, less than one hundred miles south of Rome. The town is crossed by the Gari and Rapido rivers, which combine and later join the Liri. The river formed by their conjunction, the Garigliano, marks the border between the regions of Lazio and Campania. Because it sits between these rivers, at the foot of massifs that loom over land to the south, east, and west, Cassino has seen battle wash over it for centuries. The town and the mountains behind it stand firmly in the way of any army trying to claw its way north on the Italian peninsula. The famed monastery founded by Saint Benedict on the heights of Monte Cassino has been rebuilt no less than five times since its first construction—stone by stone, brick by brick—just as it had been before.

The town's conquest has never come easily. Nor was this the case as the Allies fought their way up the Italian boot in 1944. German paratroopers commanded by Luftwaffe General Albert Kesselring had made the town of Cassino central to their "Gustav" line. They were determined to fight for every bloody inch of soil. In the meantime, they worked to fall back in good order to their Hitler line, which lay immediately north. Four immense battles were fought to remove the Germans from Cassino and its nearby monastery. In the end, eighty thousand Allied soldiers (including U.S., British, Canadian, French, Algerian, Moroccan, Polish, New Zealander, and Indian troops) and fifty thousand Germans would be killed in and around the little town—a butcher's bill conspicuous even among the general slaughter of world-wide combat. Observers at the time commented that Cassino was the only modern battle that reminded them of the hellish trench warfare seen during World War One's Passchendaele.

As a prelude to the third Cassino battle, Allied planners decided to "soften up" the town's defenses with a withering aerial and artillery bombardment. Operation BRADMAN directed nearly five hundred bombers to target the town, for the most part dropping five-hundred and thousand-pound demolition bombs. Three hundred would be heavy, four-engine bombers—B-17's and B-24's. The remainder would be mediums: B-25's and B-26's. The 320th would furnish thirty-six of these bombers, and Dan Cassino would fly as navigator in one of them. Planners hoped the fierce bombardment would be enough, by itself, to largely destroy any enemy opposition.

The Allied bombers began their runs on the morning of March 15th, promptly at half past eight, and ended them at noon. Participating bomber groups hit the town in ten- to fifteen-minute intervals all morning long. Roughly a thousand tons of bombs were dropped on the town of Cassino, and about half of these fell within a mile of its center—an average of four tons of high explosive per acre. By the time the last planes left, much of the town had ceased to resemble anything constructed by man. Hardly a house remained standing, and even the bare outlines of streets and walls were largely erased. In their place lay heaps of rubble pocked with craters of various sizes. The craters quickly filled with water, due to incessant rain earlier in the month. Fine chalky dust kicked into the air from demolished plaster took about an hour to settle on the desolation that remained. Destruction was total.

Even so, the targeted Germans were not annihilated. Those who had burrowed into deep basements or hidden in the rocks of the nearby hills had survived. Astonishingly, many were still ready to fight. They defeated the Indian and New Zealand troops who now tried to take the town and the mountain beyond. Fighting would continue until June, when the Germans finally quit their trenches and fell back toward the Liri Valley and the Hitler line.

The mission was Cassino's twenty-first, and he makes very little reference to it in his diary. He went on to fly forty-two more before returning to the U.S.—five or six every month he remained part of the bridge-busting 320th. Between missions, he walked through nearby villages, to meet the people there and to obtain eggs and vegetables to supplement his tent's G.I. diet. He helped build a small house from debris found around the old German-Italian airfield, so he and his buddies could improve their living conditions. He earned an "R&R" (rest and recuperation) week on Italy's nearby Amalfi coast, where he visited the famous blue grotto on the beautiful Isle of Capri.

In those days, there were no clear rules governing how long a flight crew member could remain in combat. Joseph Heller's description of the rules for aircrew combat longevity—in his famous novel ***"Catch-22"***—may fall closer to the mark than many prefer to believe (Heller served as a bombardier in a B-25 squadron, stationed on nearby Corsica):

"There was only one catch and that was Catch-22, which specified that a concern for one's safety in the face of dangers that were real and immediate was the process of a rational mind. Orr was crazy and could be grounded. All he had to do was ask; and as soon as he did, he would no longer be crazy and would have to fly more missions. Orr would be crazy to fly more missions and sane if he didn't, but if he were sane he had to fly them. If he flew them he was crazy and didn't have to, but if he didn't want to he was sane and had to. Yossarian was moved very deeply by the absolute simplicity of this clause of Catch-22 and let out a respectful whistle." (page 56, chapter 5)

In any event, a flight surgeon's intervention ended Cassino's combat flying after sixty-two missions—though he flew one more as lead navigator, at the request of his group commander. He returned stateside in October 1944 having been awarded the Distinguished Flying Cross and the Air Medal with five oak leaf clusters. In addition, he wore both a distinguished unit citation and the Croix de Guerre—awarded to the 320th for supporting French forces in their march toward Rome.

Though his family greeted him with warmth, it was a lonely homecoming. He would never reunite with his first wife, who soon divorced him. The failed marriage left him (in his mind) forever separated from the church he had been raised to love. Many of his best friends were dead, gone, or horribly wounded. The plans he had made just a few years ago for an orderly life now seemed hollow. The world he had known before going to war was erased from reality.

Cassino had changed as well. He was far more quiet now and carried an inner tension that would never leave him. Today, he might well have been diagnosed with PTSD (post-traumatic stress disorder). The distant stares and tortured, recurring dreams of returning warriors has been noted since the first recorded wars three thousand years ago. In Shakespeare's "***Henry IV"*** (Part I, scene three, page two) Lady Percy accurately describes its symptoms in her battle-weary husband, Hotspur, as though they had occurred today:

LADY PERCY: O my good lord, why are you thus alone?
For what offense have I this fortnight been
A banished woman from my Harry's bed?
Tell me, sweet lord, what is't that takes from thee
Thy stomach, pleasure, and thy golden sleep?
Why dost thou bend thine eyes upon the earth,
And start so often when thou sit'st alone?
Why hast thou lost the fresh blood in thy cheeks
And given my treasures and my rights of thee
To thick-eyed musing and cursed melancholy?
In thy faint slumbers I by thee have watched,
And heard thee murmur tales of iron wars,
Speak terms of manage to thy bounding steed,
Cry 'Courage! to the field!' And thou hast talked
Of sallies and retires, of trenches, tents,
Of palisadoes, frontiers, parapets,
Of basilisks, of cannon, culverin,
Of prisoners' ransom, and of soldiers slain,
And all the currents of a heady fight.
Thy spirit within thee hath been so at war,
And thus hath so bestirred thee in thy sleep,

That beads of sweat have stood upon thy brow
Like bubbles in a late-disturbèd stream,
And in thy face strange motions have appeared,
Such as we see when men restrain their breath
On some great sudden hest. O, what portents are these?
Some heavy business hath my lord in hand,
And I must know it, else he loves me not.

More recently, Civil War veterans called the malady "nostalgia," because it made them relive the horrors of their past battles. In World War One, the "thousand-yard stare," and "shell shock" were two of the labels it was given. World War II dignified these with a more scientific description, and "battle fatigue" became the accepted term. Whatever name is attached to it, the cause has become clear: the condition occurs among those who are confronted with what they believe is the certainty of immediate death, yet still survive. Scientists who study PTSD have discovered that it is more than just a psychiatric affliction. Real, physical alterations take place to the structure of the brain among people who have been stricken—as though their minds are preparing for demise. These changes don't go away. They are permanent.

Did Cassino suffer from battle fatigue or PTSD when he returned home from his time in Decimo? It is impossible to prove conclusively. Still, some insight can be drawn from a scene in his favorite movie, "***Twelve O'clock High***." In this World War II drama there is a scene where Gregory Peck, who plays a bomber group commander, cannot make himself climb into his plane no matter how hard he tries. Cassino never tired of watching the movie, and always nodded in sympathy as he watched Peck's character vainly try to swing himself into his bomber.

Chapter 10: Between Hot and Cold

Upon his return stateside late in October 1944, Cassino spent several weeks of "R&R" in Houston, Texas. Officers enjoying this respite were given access to near-by Royal Oaks Country Club. It was here—as he lounged by the swimming pool and played countless hands of bridge—that he met the young woman who would become his companion for the rest of his life. Claudia Alvord was the daughter of a World War I veteran and Annapolis graduate who had been "retreaded" for World War II service. At the time, he ran the Navy's V-12 program at Rice University. The young people hit it off and soon began dating.

Late one afternoon, as Cassino escorted her to a cab which would take her home, Claudia was suddenly deserted by her beau. Leaving her side, he rushed down the street—toward another young officer racing toward him. The two collided and embraced. She learned the man was Bob Casaburi, back from the dead.

Casaburi's survival was miraculous. Swimming away from his bomber as it sank in the Mediterranean, he was picked up by a German U-boat. The submarine made its way through the straits of Gibraltar and deposited him in France, where he was interned as a prisoner of war. Casaburi escaped his confinement and was smuggled by the French underground through Allied lines, where he was finally repatriated—a wonderful outcome for a very lucky man. He told Cassino how he was guided through a cave that ran between Allied and German lines. "It was like a business," he said. "The French were moving Americans one way, Germans the other."

Cassino soon returned to his family in New York. He and Claudia kept in close touch with each other through calls and letters. Almost a year later, the day after her eighteenth birthday, Claudia quit high school and caught a train north to join her Air Corps sweetheart. The two had an October wedding in Wilmington, Delaware—just as the war was finally ending.

Now relegated to inactive duty, Cassino had trouble finding his place in civilian life. Like thousands of others, he became part of the "52-20 club"—the program that gave veterans twenty dollars a week for up to a year while they looked for civilian employment. In 1946, he went to work as a Macy's salesman but didn't like the job. He took some law classes at Saint John's but stopped after a couple of semesters. The following year, he moved his young family from New York City to Boise, Idaho—to help manage his father-in-law's dry-cleaning business. The partnership didn't last long. The business was sold in 1948, and Cassino came back to Queens to help his uncle run a dry-cleaning shop there. He quit the dry-cleaning trade altogether after a year and began selling insurance for Provident. In the meantime, the couple had two children and bought a Long Island home—one of the thousands that Levitt was mass producing to house post-war G.I.'s and their families.

It was a heady time for the nation. Cars were back in production, and ration books were just a bad memory. The music was as upbeat as the time, as plastic products and technicolor movies became common. That new thing called television found its way into a growing number of homes in every neighborhood. New housing seemed to spring up on every empty lot, supermarkets and gas stations on every corner.

Suddenly, that silver cloud showed some dark edges. The bomb that ended the war with Japan—the atom bomb—changed the way the world worked, and not entirely for the better. Recent ally "Uncle Joe" Stalin was now behaving like an enemy. Churchill named the "Iron Curtain" which he said had engulfed eastern Europe. Mao Zedong's Communists overran mainland China, routing America's Nationalist allies. Pro-independence movements around the globe refused to be governed by their old rulers anymore. After all, they had seen those overlords convincingly defeated just a few years ago. Wars against colonial masters flared in Palestine,

Iran, Vietnam, Malaya, Indonesia, Kenya, and the Belgian Congo. Similar conflicts would follow for years to come. India demanded and was granted independence. The old rule that had seemed so secure just a decade before was breaking down everywhere, swept aside by angry demands for freedom and self-determination.

North Koreans, equipped with Soviet and Chinese arms, tried to conquer their entire peninsula. The attempt ignited a United Nations-sanctioned "police action" that would ultimately cost the lives of thirty thousand U.S. troops and end in bloody stalemate at the thirty-eighth parallel. A new kind of war, a war with little direct confrontation—a "cold" war of geopolitical chess moves, covert agents, and proxy conflicts—was taking shape. Finally, and most alarmingly, the Soviet Union challenged the nuclear hegemony of the west. In 1949, the frigid Semipalatinsk tundra heated to the first successful test of a Russian atomic weapon. A shadowy new conflict and a dangerous arms race was born.

Claudia Cassino was in Florida visiting her parents in 1950 when word reached her to sell the house in Long Island, catch a train, and bring the children to California. Her husband was back on active duty in what was now the U.S. Air Force. He would be waiting for them at March Air Force Base, in Riverside. Cassino's attempt to adjust to civilian life was over. Soon, he would be back in a bomber once more.

Chapter 11: Strategic Air Command

Riverside, California sits roughly sixty miles east of Los Angeles. The city's history can be depicted by the fruit trees that surround it. The first oranges grown in California were planted there in the late nineteenth century. Their success led to an arboreal gold rush that made the state one of the world's great citrus producers. Riverside also boasts the world's largest Dixie Cup (actually made of concrete), though the local factory which manufactured them has long since closed. As the gateway to California's Inland Empire, so sober that no bars existed within its borders until after the nineteenth century, the town has also built strong links to Hollywood's film industry. "***Gone with the Wind***" was first shown to the public at a Riverside movie theater.

By 1950, Riverside had become—for the most part—a middle-class worker's town, home to burgeoning manufacturing plants. Fruit and produce packing facilities processed the bounty from nearby farms and orchards, then shipped it to feed a hungry nation. Housing was scarce, especially for families struggling to make ends meet on Air Force pay.

It was here, at March Air Force Base, that the 22nd Bomber Group was reconstituted as a Wing and brought back to life. The new wing would be part of General Curtis LeMay's just conceived Strategic Air Command (SAC), the world's first large-scale nuclear weapons delivery force. LeMay had led B-17's in the massive daylight bombing raids over Germany in 1943 and 1944. After that, he commanded the destruction of Japan by fire-bombing B-29's in the Pacific. A blunt, brutally efficient organizer, he was the perfect architect for the nation's nuclear bomber fleet.

In 1947, it was a fleet that didn't really exist. Less than thirty nuclear-capable bombers were fit to fly, and only nine bombs were available for them to carry. Additional weapons were in production, but the paperwork needed to release them from civilian (Atomic Energy

Commission) authority would require days or weeks to complete. Still, President Truman and his pentagon planners advocated what then seemed to be an almost unattainable mission: the destruction of twenty Soviet targets using fifty atomic bombs within a month after declaration of hostilities between the two nations. By 1949, the goal had expanded dramatically. At that time, revised plans called for one hundred thirty-three bombs to be used against seventy Soviet targets.

The Berlin blockade and airlift, the communist-inspired Greek Civil War, the outbreak of conflict in Korea, all called for countermeasures. The United States, Canada, and ten western European democracies (Great Britain, The Netherlands, France, Italy, Denmark, Norway, Belgium, Luxembourg, Iceland, and Portugal) formed NATO—the North Atlantic Treaty Organization—to mutually resist Soviet aggression in Europe (the Soviets would react with the formation of Eastern Europe's Warsaw Pact in 1955).

In the meantime, LeMay nursed his new command from a handful of aging B-29's to the foundation for a true offensive weapon. By 1948, SAC had sixty mission-capable nuclear bombers (mostly "silver plate" B-29's, manufactured by Boeing for the express purpose of carrying atomic bombs), and began to receive delivery of the enormous B-36—one of the largest aircraft ever built in quantity. With the B-36 "Peacemaker," LeMay finally had at his disposal a bomber with the range to reach and return from intercontinental nuclear targets.

The perceived threat that followed the first Soviet atomic tests hastened the evolution of SAC and its mission. By 1952, LeMay's bombers were tasked with dropping five hundred atomic bombs on hundreds of Soviet cities and military bases during the first thirty days of a foreseen conflict. This was the fevered atmosphere that greeted Cassino as he returned to active military duty. He finished B-29 training just in time for assignment to what the 22nd Bomb Wing had become: one of SAC's early atomic bomber units.

Cassino had been anxious to return to active duty. The B-29 he now crewed was far larger than the B-26's he had flown in the past. As a navigator he had a comparatively luxurious workstation, plenty of room in the bigger, pressurized cabin to stand—or even walk around a little. The big bomber had four engines instead of two and could reach and return from targets more than two thousand miles away, at a speed approaching four hundred miles per hour. Most important of all, the B-29 could carry an atomic bomb. It was the first airplane in the world to have done so.

Soviet technicians, gaining access to interned B-29's that had strayed over Manchuria, reverse engineered the big bomber to carry their own planned atomic weapons, then under feverish development. The first Tupolev Tu-4 bomber, a close B-29 copy built to metric specifications, flew in May 1947. Over eight hundred were eventually built. They remained the bulwark of the Soviet nuclear bomber fleet until replacement by more modern aircraft began in 1954.

B-29's did not have enough range to reach their assigned targets in the Soviet Union from U.S. bases. So, from time to time, SAC units like the 22nd had to be deployed forward to closer locations—in the United Kingdom, continental Europe, North Africa, or Japan. Many of these missions, which might last weeks or even months, commenced without any warning to the air crews involved or their families. A flier would simply leave for work one morning and not show up for dinner. SAC wives learned to live with these sudden, unexplained absences. After a few days, word would filter back to them through the grapevine about where their husbands were and when they might return.

SAC crews might also be sent on unannounced mock bombing missions, simulating Soviet targets with cities or installations in the U.S. Instead of actual bombs, radar "pings" were

used to judge the accuracy of a plane's effort. When these training exercises began, their outcomes were far from satisfactory. LeMay began rewarding crews that got the best results, and within a year levels of accuracy climbed to acceptable levels. Many of these missions occurred at night, causing more hectic separations between SAC crew members and their families.

Cassino's family endured several of these unannounced TDY's (temporary duty assignments)—including a three-month deployment to Great Britain in 1951. He enjoyed the competition of the SAC missions, but soon noticed the recurrence of a problem that had troubled him in the past. His B-26 missions during the war seldom called for his bomber to fly above an altitude of five or six thousand feet. Even so, a few missions did require the plane to fly higher. When that happened, Cassino was affected. "Went up to fifteen thousand feet today," he wrote about a 1944 mission to Perugia. "Sure was tired."

Now, every mission he flew reached altitudes of thirty to forty thousand feet or better. Even though the planes he flew in had pressurized cabins, Cassino discovered that his symptoms had returned. He reported the problem to the flight surgeon and was temporarily removed from flying status pending further medical tests.

Not long after this, every squadron in the wing was ordered to nominate an officer to be sent to nuclear weapons school—known to be a tough, intellectually demanding assignment. Only one of those put forward would be chosen by SAC to attend, but none of the units tasked wanted to lose an officer. Their ranks had already been severely thinned by demands from Korean War-deployed B-29 units. The squadron leader called Cassino to his office. "We'll fool them," he crowed. "We'll nominate you! Since you're grounded, they won't want you, so some other squadron will have to take the hit."

Though neither man knew it at the time, this decision would be a life changing event for the young lieutenant. When word from SAC was received a month later, both Cassino and his commanding officer were surprised. He'd been selected after all. His service record and education trumped any medical issues. Pending the results of a background investigation needed to raise his security clearance, Cassino was ordered to report to Sandia Base, near Albuquerque, New Mexico, to begin nuclear weapons training. His career as a nuclear warrior was about to begin.

Chapter 12: Yucca Flats

The FBI background investigation took almost three months to complete. During that time, Cassino and his family prepared for the move to New Mexico, while he kept busy with several administrative assignments for the 22nd. One of these required an inventory of the wing's spare fifty-caliber machine gun barrels, which filled a Quonset hut near the March flight line. B-29's used eight turret-mounted machine guns—as well as three more controlled by the crew's tail gunner—for defense against attacking fighters. Plenty of replacements had to be kept on hand, since the barrels could rapidly overheat or wear out during combat. Cassino obstinately refused to accept the results of a casual "eyeball" inventory. He demanded a full, exact count before he would sign any paperwork guaranteeing the warehouse stock level. This raised the ire of the wing's S-4 (the officer in charge of supplies), who berated him as an excessively timid "bean counter" tied to regulations and as an overall "pain in the ass."

Cassino's position became unpopular, but he maintained it in the face of all criticism—whether shouted or whispered. Within a few weeks, a full inventory was performed. The results shed light on the reason behind the S-4's vigorous complaints. More than a quarter of the barrels were missing, with no justifiable reason for their absence. The irate officer was court-martialed, demoted, and heavily fined. Cassino was vindicated, but critics within the wing continued to condemn his strict, "by the book" attitude. "If he was left out in the rain," one said, "he'd rust." The reputation he gained in that incident and others for a tough, firm (some said stubborn) attitude stuck with Cassino for the rest of his military career. He did nothing to reject or refute the label. On the contrary, he considered it a compliment.

Cassino reported to nuclear weapons school in May 1952—driving in from California in the family '41 Cadillac. Claudia and the boys followed by train. His was one of the first larger

classes at the installation. Until 1951, nuclear weapons training had been an almost one-on-one experience. There weren't that many bombs, so the need for people who knew how to work with them was relatively low. The Ranger and Greenhouse tests conducted in 1951 changed all of that. The current atom bomb in use, the Mark 4, could be improved. The flow of nuclear materials—uranium, plutonium, tritium—was increasing, to keep pace with SAC's growing capacity and the mounting demands of Pentagon planners. More bombs were on the way. Lots more. A corps of specialists was needed to maintain and prepare them.

Cassino and his just-relocated family had reason to celebrate as they moved into their dark green adobe home in Albuquerque that summer. He was promoted to captain—an increase in rank and pay—in June 1952. This would be Cassino's last promotion due to flying-related Air Force performance. All those in the future would depend on his prowess as a nuclear warrior.

Thirty Air Force officers—senior lieutenants and captains, for the most part—began Cassino's training with him. Less than half would complete it successfully. The first part of the course repeated what many of the students had learned, at least in part, in college: basic electronics, the physics of atomic reactions, the nature of the materials that caused them, the history, design, and fabrication of current nuclear weapons. This intense classroom training crammed two years of advanced education into four months.

During the three months that followed, students learned how atom bombs were built. Field trips to Los Alamos (pit production) and Livermore Labs (research and design), as well as Hanford, Washington (plutonium production) and Oak Ridge, Tennessee (component fabrication, uranium production) were made. More instruction on the structure and components of the atomic weapons of the day was conducted. Students observed some of the Tumbler-Snapper nuclear test series in Nevada.

The final ten weeks of training were the most important, at least as far as SAC was concerned. Now students learned the details of the atom bombs then in service—how to assemble them, maintain them, store them, disarm them, load them into bombers, and prepare them for detonation.

Most of the students' time was spent with the Mark 4, which was SAC's standard nuclear weapon at the time. The Mark 4 had been in production since 1949. Its design was similar to "Fat Man" (the Mark 3), the world's first implosion atomic bomb. Its dimensions were much like the Mark 3: a swollen cylinder five feet in diameter, eleven feet in length, weighing five tons. Depending on configuration and selected pit, its explosive yield could reach the equivalent of thirty-one thousand tons of TNT—about twice the yield of the original Nagasaki bomb that ended World War II. By the time production ended in 1953, five hundred fifty Mark 4 bombs had been delivered to SAC units—roughly one each for the bombers available to deliver them at the time.

The Mark 4 was not merely a "Fat Man" carbon copy. It was extensively re-engineered, made both safer and easier to manufacture. The updates made it less difficult to store and assemble, more "G.I. proof" than its experimental ancestor. Among its innovations was the "inflight insertion" or IFI concept, which continued to be used by SAC for several years. Under IFI, the bomb's nuclear core—the pit—was stored in a protective "birdcage" separate from the bomb itself until the delivery aircraft was close to its objective. So, if the bomber had mechanical trouble or was shot down on its way to the target, there could be no possibility of a premature atomic explosion. When the target was near, the pit was inserted into the bomb core through a detachable segment of the explosive lens assembly—the constellation of shaped charges that

would cause the implosion to take place. Once the pit was in position, the lens assembly segment was re-attached, and the bomb was ready to be sealed and armed.

Though IFI made sense considering the technology of the day, it was at best a difficult chore for the airmen who had to perform it. The bomb bays of SAC aircraft were neither pressurized nor well lit. They had not been designed to be workplaces during flight. At altitudes above twenty thousand feet, the temperatures within them ranged from frigid to sub-zero. Yet the insertion teams (remember the two-man rule) were expected to spend considerable time in this environment, preparing atom bombs their planes carried for successful detonation. The slightest misjudgment could damage a lens assembly or even the pit itself, ruining the bomb. It is a tribute to the dedication of the SAC bomber crews of the early to mid-fifties that they were willing and able to perform this difficult job.

A variant of the Mark 4 was also in production. The Mark 6 shared its brother's dimensions and weight but used a redesigned implosion system. Yields of up to one hundred sixty kilotons could be achieved. More than a thousand of these bombs were produced, and they remained in SAC inventory until 1962.

The nuclear weapons school students were also introduced to the newest bomb in the nation's nuclear inventory, the Mark 5. The new bomb was considerably slimmer than its older brother—less than four feet in diameter to the Mark 4's five feet. Though both were the same length (eleven feet), the Mark 5 weighed only one and a half tons, less than half that of its predecessor. This was the most important factor. It meant that a B-29 might be able to carry a Mark 5 farther, while aircraft with larger bomb bays could carry more than one.

There were other differences. From a crew member's viewpoint, the most important design change was the addition of clamshell doors opening the bomb's nose. This allowed

automatic insertion of the pit into the implosion assembly, once it had been extracted from its protective “bird cage.” All insertion teams had left to do then was to close and secure the doors to ready the bomb for detonation. Their job was now considerably easier—and less prone to errors or mistakes. Mark 5’s saw service from 1952 to 1963. Depending on core design (there were at least four) and pit selection, yields of six to as much as one hundred twenty kilotons could be achieved.

Finally, Cassino and his classmates were introduced to the only descendant of the Hiroshima bomb still in service. The Mark 8 nuclear bomb was a gun-type uranium device, like the original “Little Boy” delivered by the Enola Gay’s crew. Instead of using more sophisticated implosion technology, gun-type weapons simply fire a uranium “bullet” through a barrel within the bomb’s interior, toward a larger fissile “target.” Fission occurs when the two parts collide and exceed critical mass. The Mark 8 was a little less than fifteen inches in diameter, almost eleven feet long, and weighed about one and a half tons. Its yield was as much as thirty kilotons, but it had one spectacular feature. The Mark 8 was a “bunker buster.” Its hard-nosed design allowed it to penetrate more than twenty feet of reinforced concrete, ninety feet of compacted sand, or one hundred twenty feet of clay before detonation. Forty of these antiquated but unique devices were produced. They remained in SAC inventory until 1957.

It was a lot for the students to absorb, an enormous amount of detail to remember. In the drills that followed, Cassino and his classmates were expected to flawlessly inspect, assemble, arm, deactivate, and disassemble the Mark 4, 5, and 6 bombs they’d find at the units each would be assigned to when their training was completed.

Although many of the students would memorize the steps of each procedure by the time their training ended, SAC did not expect them to rely on memory. On the contrary, their every

move had to be executed precisely as it was spelled out in the appropriate manual, and the manual was required to be present and open to the appropriate page at all times. In fact, every action was predicated by its announcement, read directly from the text by a team member. Given those rules, few mistakes were expected. None were tolerated.

Still, human beings are fallible, and errors happened. A tool might be dropped, misplaced, or improperly used. Application of degreasing, spark-retardant trichloroethylene could be mishandled. A step might be performed differently than what was explained or illustrated in the manual. When such blunders occurred, progress ceased while the offending team was re-educated by the ever-present technical inspectors about the proper procedure. This grueling repetition continued, day after day, until the inspectors considered those they observed competent … or not. Almost half of the officers who failed to complete nuclear weapons school washed out during this phase of their training.

The surviving students came back to the classroom for their final weeks of training. Now they learned the intricacies of weapon storage, transportation, and bomb bay insertion. They were instructed on security—how to report malfunctions, need to know, the two-man rule, the care and destruction of classified documents, and the rules and regulations pertinent to the weapons they must now shepherd. Finally, after a brief congratulatory speech by the school commandant, they were issued their orders. Cassino's previous education served him well. He graduated near the top of his class and was assigned to the 505th Aviation Squadron. There were more than twenty similar squadrons formed at Sandia between 1949 and 1955. Their job was to maintain nuclear weapons and train air crews at the Air Force facilities where they were positioned. The 505th was deployed to Chennault Air Force Base, near Lake Charles, Louisiana.

The weekend brought real culmination to the tough training. Graduates and their wives attended what was becoming a quasi-tradition at Sandia Base: A Yucca Flats party. Named for the site of the first atomic explosion, the party's centerpiece was a large tub filled with a libation of the same name—a heady mixture of grape juice and grain alcohol. While no one present was required to drink more than one (though many did), everyone was expected to try a cup. The next morning, truly nuclear headaches greeted those who had sampled the tub a few too many times.

Cassino packed his household, loaded the family in their vintage '41 Cadillac, and headed for Lake Charles and the 505th—his first assignment as a nuclear weapons professional.

Chapter 13: Sulfur, Mike, and Joe

Lake Charles, Louisiana, lies in the Cajun country of southwest Louisiana, not far from the Texas border and Beaumont. Shouldering the Calcasieu River, the city is home to the Mardi Gras Museum and has remained a major petrochemical refining center for decades. In 1953, when Cassino arrived there, Lake Charles was home to more than forty thousand people. Chennault Air Force Base sprawled south and east of the city (the base closed in 1963 and is now the city's airport). Two SAC bombardment wings—the 44th and the 68th— were based at Chennault then. Both had recently been re-equipped with Boeing's sleek new B-47 Stratojets.

The new bombers were beautiful to watch, as fast as many fighters of the day, and could fly as far as a B-29 (over two thousand miles) while carrying twice the older, much slower plane's bomb load. Eventually, almost two thousand Stratojets would be put in service by SAC, equipping twenty-eight bomber wings. They formed the backbone of LeMay's bomber forces through the 1950's, until B-52 Stratofortresses began replacing them on alert in 1959.

Even though he enjoyed it, Cassino's job at Chennault was far from glamorous. He had to take part in the storage, maintenance, assembly, transportation, and loading of nuclear weapons for nearly one hundred bombers, as well as conduct crew and technician training. The war readiness of two strategic bomber wings depended on his expertise. He used his just-learned knowledge to good effect, helping to reorganize Chennault's nuclear weapons facilities and improve training procedures.

In the meantime, his family dealt with the vagaries of their new home. There were dozens of producing oil and natural gas fields in southwestern Louisiana at the time, as well as a working sulfur mine. The odors from these industries were pervasive in some areas. Rainfall was near sixty inches a year, making the soil wet and porous—some just-relocated SAC residents

would say “swampy.” Most of the housing available was on stilts, and some local wildlife (including copperheads, cotton mouths, and other poisonous snakes) found those damp, dark places under the houses ideal for their own residences. The local mosquito population was large and active. Perhaps worst of all, water from the tap held the bright yellow hue of the sulfur it contained, and saffron stains colored every home’s sinks and tubs. New residents quickly learned not to drink directly from the tap. Instead, drinking water had to be poured into pitchers. After a while, the heavier sulfur sank to the bottom, and water at the top of the pitchers could be safely consumed. They persevered. To SAC airmen and their families, Chennault was just more evidence that the military invariably chose the least appealing places in the nation to put their bases.

While SAC families were struggling to adapt to their new quarters, crucial advances that would change their futures were occurring far west in the Pacific. As Cassino was just beginning nuclear weapons school, the Mike test of Operation Ivy detonated at Elugelab Island in the Marshall chain. Tests had been moved there from Bikini to take advantage of the larger islands and deeper water at the new site. This would be the first detonation of a hydrogen, or thermonuclear device—the “super” brainchild of Teller and Ulam.

After the October 31st test, a crater more than a mile wide and one hundred fifty feet deep below the ocean’s roiling surface was all that remained of Elugelab. The ten-megaton blast forcefully proved Teller’s theories. Thermonuclear detonations were now a reality. Even so, Ivy Mike could not be called a bomb. The device was three stories tall and weighed over eighty tons—most of its bulk required to cryogenically maintain deuterium at ultra-low temperatures. No aircraft in the world—not even the gigantic B-36—could accommodate it, much less fly it anywhere. To become a credible deterrent, Mike had to be “weaponized.”

Even further around the globe, Soviet scientists led by the brilliant physicist Andrei Sakarov worked hard on their own thermonuclear weapon. Their paranoid leadership had become aware of U.S. progress from spy reports dating back to the ‘40’s. Less than a year after Ivy Mike disintegrated Elugelab Island they set off their own device, vaporizing a test tower in the Semipalatinsk tundra with a four hundred kiloton detonation. The test was labeled Joe-Four by the west. In his announcement to the world, Premier Georgy Malenkov noted that the Soviet device was bomber-ready and in production for immediate use.

The U.S. countered with the Castle tests, determined to shrink a building-sized “gadget” to weights and dimensions SAC could deliver. Castle Bravo met and exceeded the military’s hopes. The device used room-temperature lithium deuteride as the fusion agent, ending the need for bulky, heavy cryogenic cooling, shrinking its size dramatically. When detonated on a reef near Bikini Atoll on March 1st, 1954, it surpassed designer’s expectations by one and a half times, yielding a fifteen-megaton blast—a thousand times more powerful than the original Hiroshima bomb.

Five Mark 14 thermonuclear bombs were quickly produced. They were weaponized, but just barely so. Five feet in diameter and more than eighteen feet in length, each bomb weighed over fourteen tons.

The Mark 17 and Mark 24 series followed. Deliveries to SAC units began in April 1954 and continued for a year. More than three hundred were produced. They were enormous—even by nuclear weapons standards. Six feet in diameter and almost twenty-five feet long, each weighed more than twenty tons. They were too large for any SAC bomber of the time except the huge B-36 Peacemaker. Their yields matched their size—the equivalent of fifteen megatons of TNT.

Soon thermonuclear bombs would be miniaturized further still, made small and light enough to be carried by SAC B-47's and the upcoming B-52's. Cassino would not remain at Chennault to see that happen. In August 1954, new orders sent him to Goose Bay Air Base in Labrador.

Chapter 14: Frozen Seaweed

It would be an unaccompanied assignment. That meant Cassino would have to leave his family in the U.S. and proceed to his new duties at Goose Bay Air Base without them. Unaccompanied assignments are short, a year or less in length—but that can be a long, lonely time for airmen and their families.

The need for U.S. nuclear warriors in Canada's frozen north was triggered by SAC's Operation SEAWEED, LeMay's vision of forward bases where SAC bombers could be loaded with their nuclear bombs and sent to their initial war targets. From Goose Bay they could reach many of them easily, using trans-polar routes. Those that survived would return, reload, and fight some more. Similar facilities had been constructed at three Moroccan air bases (Sidi Slimane, Ben Guerir, and Nouasseur).

By the time Cassino arrived, in August 1954, most of the weapons area construction had been completed. Four large earth-covered storage bunkers for nuclear pits in their protective birdcage frames were finished, as were spares warehouses and a group of "plants" to assemble bombs for waiting SAC aircraft. Guard towers and double barbwire fences were in place. Free-running guard dogs and human security patrols were already in operation. Goose Bay's enormous base runway could accommodate any SAC bomber, even the lumbering B-36. Additional facilities to house thermonuclear weapons were being planned.

Cassino was initially assigned as a loading supervisor. Within a month he was named assistant assembly plant supervisor, even though several other officers out-ranked him. He spent a cold, windy year practicing his trade as a nuclear warrior. Drills involving SAC wings flown in were conducted often, irrespective of weather conditions. LeMay demanded that his bombers be ready to fly and fight at any time. There were also proficiency inspections, one almost every

month. Some were from within SAC. Some were conducted by DASA technicians. Some were scheduled, while others were an unpleasant surprise.

The inspections invariably followed the same schedule. Documents and manuals were scrutinized, to make sure that all were complete, up to date, and properly secured. All bomb handling equipment and tools were examined for wear and utility. Facility security was inspected, to make sure it was airtight. Finally, a series of mock assembly and transport operations using inert "blue" training bombs was conducted—under baleful eyes of visiting technical experts. Every aspect of every detail was expected to be perfect. Every minor imperfection discovered required a lengthy RBI (respond by indorsement), explaining in excruciating detail how the exposed flaw or error would be mediated or corrected. Major deficiencies could damage careers. Everyone involved accepted the drudgery. All recognized that the incredibly powerful, dangerous weapons they supervised demanded this constant level of oversight. Even so, the TPI's (technical proficiency inspections) were tense, exhausting experiences.

While Cassino was at "the Goose," another officer failed his part of one of these exacting inspections. A top-secret manual under his control was discovered to be missing a page, without explanation or proof of proper disposal. The officer was court-martialed, reduced in rank, stripped of his security clearance, and shipped home. Ironically, the missing page contained no sensitive information. It was a filler, labeled "This page intentionally left blank." A future ruined over a blank piece of paper—the rules were harsh for nuclear warriors, then as now.

LeMay and his planners assumed Goose Bay would be isolated from resupply in the event of war. Four warehouses had been constructed between two and five miles from the base to hold food and other supplies, so that operations could continue even when contact with the

outside world was cut off. During a rare period of inactivity, Cassino was tasked to inspect the warehouses and check on the state of the stocks they held.

Winters are severe in Goose Bay. Snow fall averages six feet a month, and the temperature seldom climbs above ten degrees Fahrenheit, even during the heat of the day. The inspection party brought shovels with them—since each warehouse would be completely buried in snow. They would have to dig to the entrances.

The first warehouse visited had completely collapsed. The weight of the snow on its roof had destroyed it. All the supplies within it were ruined. None could be salvaged.

Warehouse number two looked better, at least from the outside. Its roof and walls had withstood the assault of cold and snow. What was stored within was perfectly preserved but wouldn't prove an appetizing diet for Goose Bay airmen. The warehouse was stocked from floor to ceiling with Canadian green beer. Close scrutiny of the records pertaining to the warehouse gave no answers. When inspected during the previous year it had contained cartons of "c" rations.

The remaining storage facilities were undamaged and contained only the food and supplies listed on their manifests. The enigma of warehouse two remained unresolved, a mystery of the tundra. In an attempt to alleviate the matter, Goose Bay's base commander issued the inexplicable beer to the officers,' non-commissioned officers', and enlisted men's clubs. It would be provided to those who wanted it for free, with orders that no more beer of any kind would be ordered until the green beer was totally consumed. Canadians on the base were sanguine. Americans were glum. Cassino stuck to his occasional Manhattan and made no comment.

His only concern through the long, cold assignment was the hollow, weakening ache in his chest he sometimes felt. When it came on him, Cassino pushed it out of his mind—as he had

willed himself to do in the past. The dull pain would subside after a few minutes. He would continue to disregard it until the end of his life.

By the time summer was leaving Goose Bay, Cassino had new orders. He joined his wife and children in New York City, for the first time in six months. The kids each got a real "coonskin cap"—just like Davy Crockett wore on TV. Belongings packed, he and his family drove their '53 Chevy to Dayton, Ohio, and his new assignment at Wright-Patterson Air Force Base.

Chapter 15: The Brains of the Air Force

Large organizations with thousands of employees and many locations begin to resemble living creatures in their complexity. Given that analogy, Wright-Patterson Air Force Base would certainly have to be considered the "brains" of the U.S. Air Force. Located at the northeastern corner of Dayton, Ohio, the base has been at the forefront of aviation development since the first years of the twentieth century.

Dayton is a solid Midwestern city founded in 1796. With a population that began shrinking in the 1960's and currently stands at roughly 190,000, Dayton remains home to NCR (National Cash Register), best known for its money management equipment, and as the forerunner-parent of IBM. Orville Wright was born in Dayton—the site of the bicycle shop where he and brother Wilbur created their first airplane.

Reporting for duty in August 1955, Cassino was assigned to the 3079th Air Depot Wing—a new unit with a bland name and a very important mission. The 3079th was created to control the deployment and management of the United States Air Force nuclear arsenal.

During the early days of the nation's nuclear stockpile, storage and shipments were controlled by the Atomic Energy Commission (AEC) directly. A special military unit, the Armed Forces Special Weapons Project (AFSWP) built and operated four main stockpile storage and assembly sites (called "Q" sites, due to the security clearance restrictions required to access them), all constructed near operating Air Force facilities in New Mexico, Kentucky, and Texas. Two more "Q" sites were added a few years later.

Sandia Base began construction of five operational storage sites in 1950. These smaller alert facilities were located adjacent to Air Force Bases in Maine, South Dakota, Washington, California, and Massachusetts. In 1955, Sandia and the AEC transferred control of these alert sites to the Air Force's Air Materiel Command. Each would be supervised and staffed by an

Aviation Depot Squadron. The squadrons would all report to the 3079th Aviation Depot Wing, organized at Wright-Patterson. By the time Cassino reported for duty in September, the wing had been operating for eight months.

His initial assignment was as a "technical data and evaluation officer." This meant frequent flights to each of the sites under Air Force control to assess storage capacity, maintenance levels, and training needs among the crews stockpiling and servicing the bombs in stock. New bombs were on their way. These would include smaller, lighter thermonuclear devices a B-47 could successfully carry. Because of the danger of sympathetic reaction, some of these new weapons could not be kept in proximity to older IFI pits. Revised procedures had to be put into place. Storage space available became an important question. Most of the time, Cassino travelled to the sites he visited using a C-124 Globemaster II from one of the three squadrons assigned to support the 3079th. These big four-engine transports could load even the enormous Mark 17 and Mark 24 thermonuclear bombs through their cavernous front clam-shell doors.

Meanwhile, Cassino's family was assigned to base housing. As an older military base, some of Wright-Patterson's officer's housing consisted of stately older homes placed along wide, quiet streets. Some of these homes were quite large and well-appointed. This was the housing reserved for general officers, colonels, and some lieutenant colonels.

Housing for ranks below those consisted of structures built following Senator Kenneth Wherry's 1949 legislation, which became a bonanza for hundreds of contractors, a sad disappointment for those who lived in what resulted. Wherry's bill required no particular standards or blueprints. He left it to the local building contractors selected to use "off-the-shelf" plans and materials to save time and money. Though constructed in different places by different minds, Wherry housing looked remarkably similar from base to base. The typical structure was a

large two-story building, holding between four and eight separate apartments. These varied in size from two to four bedrooms. Some had private washers and clothes dryers, but most had central laundry facilities—each serving two buildings. Some had basement storage, but most did not. Most had covered parking bays, one space assigned per apartment.

Building maintenance and care for the surrounding lawns was provided by Base Facilities Offices. In most cases, these offices did their best to keep the housing areas they administered clean, freshly painted, and repaired. Even so, diligence cannot always disguise shoddy construction or cheap materials. The majority of base housing financed under Wherry's legislation soon resembled genteel slums.

Wright-Patterson's Wherry housing in the fifties was built in squares of four buildings surrounding an interior court. The court became the place where children played their pick-up baseball games, and where their parents had cook-outs to discuss what they could about the day's work over a beer. Service families get along, as a rule. Each understands what the other is probably going through. Sometimes, friends from past assignments show up again. Then an almost familial reunion takes place, as each clan looks across the picnic table to see how the other has grown and changed.

In March 1956, Cassino's duties at the 3079th were changed. He was promoted to Assistant Plans and Special Weapons Officer. As a captain, he would still serve a limited decision-making role—but his extensive expertise in "special" (i.e., nuclear) weapons was recognized. He now worked at a higher level, planning the emplacement and storage of weapons and modifications yet to come. His trips away from home were fewer. He bought both of his sons bicycles for Christmas and helped teach the boys to ride them.

Another year passed. April 1957 brought new orders. The movers packed their furniture, and the family left Dayton in their ’56 Buick for their new home in Denver, Colorado.

Chapter 16: The Black Shack

Lowry Air Force Base sat on the eastern edge of Denver, "the mile-high city." The base had been actively used as a military aviation installation since the early twentieth century. It was an important Air Training Command site—specializing in electronics, photography, and intelligence instruction. Lowry was the original home of the Air Force Academy, at its start in 1955, before construction of the Colorado Springs campus was completed three years later. It became the summer White House for Dwight D. Eisenhower during his two terms as president. The base closed in 1994 and has since become an upscale residential neighborhood.

Cassino's first assignment at Lowry was as a student. He took an intensive course in missile guidance systems. This was a necessary interim step before becoming chief of TM-76A warhead training for the 3421st Student Squadron—a denizen of the "black shack." The big black hangar, surrounded by security patrols and guard dogs, has since become a skating rink. In those days, it was where nuclear-armed missile crews got their warhead training. Cassino began his new job the following October.

The TM-76 "Mace" was the last member of a family of pilotless, jet-propelled aircraft developed by the Air Force and Navy. All were descendants of the German V-1's of World War II. V-1's launched from the French and Dutch coasts by the thousands were aimed at Britain in 1944. The simply-designed, cheap-to-build flying bombs caused severe damage and many casualties until countermeasures were developed against them. V-1's could carry their two-ton high-explosive warheads about one hundred sixty miles from their launch catapults. After the Normandy invasion, Allied liberation of coastal Europe eventually put British targets beyond their range. The V-1 wasn't very accurate, but it was never meant to find specific targets. It was designed to cause random destruction to targeted cities, frightening and demoralizing their

populations. Londoners old enough to remember will testify that the “buzz bombs” did a good job at that. (For more about pilotless bombers, see Appendix B.)

Cassino’s major responsibility was training Mace crews to use the missile’s warhead, the W28. This warhead was one of a multitude of versions of the B28 thermonuclear bomb, the first light-weight bomb of its kind produced in volume. More than four thousand were produced for the Air Force between 1958 and 1966. It remained in active inventory until 1991. It was SAC’s most widely allocated nuclear weapon through the mid-1960’s when it began phasing out in favor of the B43. The version used by Mace was designed to produce a three hundred fifty kiloton explosion.

The family moved into Lowry base housing—another Wherry masterpiece, across the street from a busy flight line. The boys were put in school. Claudia joined the Officers Wives’ Club. Everybody looked forward to a year or two of stationary calm.

New orders arrived less than six months after Cassino had begun his new job. Plans had changed. SAC wanted him back. A new Air Force facility was rushing through construction on the west coast, just outside the sleepy farming town of Lompoc, California. A new kind of weapon would be perfected there. Precisely guided, nuclear-tipped rockets with ranges that spanned continents would rise on columns fire from the beautiful, empty beaches. The place would be called Vandenberg.

Chapter 17: Missiles on the Roof

Lompoc, California was a small, bucolic agricultural community when the first Air Force crews arrived in 1957. Most of the area's farmers grew flowers for Burpee and other national seed providers. The "Miss Flower Seed" festival was a prominent local event, held at the Grange each year. The town had a mixed reaction to renewal of military activities in the area. Camp Cooke had been an active training center in World War II, and then had closed with the end of hostilities. The Korean War opened it again, as an army tank training facility. After the armistice, the camp shut down once more. Some locals frowned at the notion of large transient populations, increasing prices for real estate and groceries, all followed by inevitable military abandonment a few years later. "Leave us be," they said to unhearing ears.

The area was a perfect fit for Air Force needs. It was isolated, sixty miles from Santa Barbara—the nearest major city. Security would be relatively easy to establish. The location would allow missile launches for long distances without passage over land or populated areas. It was big enough to hold current planned facilities, with plenty of room to meet future needs as well. Polar as well as equatorial orbit insertions could be achieved. Work began.

Initially, there would be no quarters available for Cassino's family. His wife and children travelled south, to stay with her parents in Guadalajara, Mexico until he called for them. The boys adjusted to ex-patriot life and attended the city's American School. Everybody learned some Spanish phrases, how to use the local buses, and what to avoid eating at a Mexican restaurant. Still, it was a bitter separation, and stressed Cassino and his wife terribly.

In the meantime, Cassino was assigned to the 392nd Missile Training Squadron, which would eventually teach U.S. and British airmen to use and maintain the Thor intermediate-range ballistic missile. That would happen once facilities, assembly hangars, roads, and launch pads

had been constructed—work which was now underway. At the same time, engineers from Douglas (the Thor airframe manufacturer), Rocketdyne (developer of Thor's engine), and A.C. Sparkplug (producer of Thor's inertial guidance system) gave on-site training to Cassino and other unit cadre on how these systems operated, and what kind of facilities each would require. (For more information about the Thor missile, see Appendix C.)

In June 1958 Cassino was sent to Tucson, Arizona for two months of intensive training on Thor systems at Douglas Aircraft's facility there. Now he could call his family back to his side since housing had become available within driving distance of Cooke. While he studied, his wife and children wedged themselves into a tiny motel suite nearby. They lounged by the pool during the blistering summer days with the families of other Thor students. Upon completion of his training, all climbed in the blue '56 Buick for their journey across the Mojave Desert to California.

The family searched for several weeks before finding a California home. No decent rentals were available in Lompoc, Santa Maria, or San Luis Obispo—the towns closest to the base. A hill-top cottage in Santa Barbara was finally located, only a few blocks from the city's hospital. The house had great views, an avocado grove, and enough space but meant Cassino would have a one hundred twenty-mile round trip to his job every day. Others had the same problem. A carpool was formed.

Meanwhile, work on the base—now named Vandenberg (after a former Air Force Chief of Staff)—had made great progress. Enlisted men had barracks, many work areas and hangars were completed, and concrete had been poured on the first "Site 75" launch pads, from which the Thor missiles would be sent into space. The missiles themselves were being shipped around the

winding curves of California's Route 101 to their final assembly hangars. The first British airmen from RAF Number Seventy-seven Squadron arrived to begin their training.

By December 1958, Thor launches from Vandenberg began with a success followed by a failure. Several more successful launches followed in 1959, a few more failures, and finally a regular stream of problem-free flights. When a Vandenberg-launched missile blew up—or was destroyed by a range safety officer concerned about its flight path—its debris scattered far and wide. Pieces often landed in base housing, on the roofs or the lawns of Vandenberg residents. When this happened, crews of Air Police in trucks were sent through neighborhood streets to reclaim the missile shards.

By this time, Cassino had left his missile training assignment and moved back into the world of nuclear weapons. The 51st Aviation Depot Squadron had responsibility for maintaining and emplacing warheads on Vandenberg's Thor, Atlas, and Titan missiles. Cassino was assigned as the unit's re-entry vehicle maintenance officer.

Taking care of nuclear bombs was nothing new. All the ballistic missiles available in the 1959 through 1962 era used the same warhead. The W49 was a modified B28 thermonuclear bomb—the most widely used H-bomb in Air Force inventory. It weighed a little less than two tons and yielded a blast equivalent to one and a half megatons of TNT. There were more than four thousand B28's of various modifications in SAC's inventory at the time.

Re-entry vehicles were new, however. They were needed to protect the warheads within them from the terrible heat generated when a missile plunged through the earth's atmosphere at the end of the ballistic arc to its target. Temperatures of over fifteen thousand degrees would be generated by this friction—enough to easily melt steel. The Mark Two re-entry vehicle deflected much of this hellish heat through shock waves generated by the vehicle's design. The remainder

was absorbed by a massive copper shield, mounted just behind the Mark Two's steel nose. The warhead was protected and reached the target ready to explode. Later re-entry vehicles moved from "heat sink" to ablative designs. The Mark Two was the last of its type produced. Cassino worked with the General Electric engineers who developed the Mark Two, supervised the mating of the re-entry vehicles and the bombs they were to carry, and taught the 51st maintenance teams how to work with both.

In the meantime, there was good news on the home front. During their two years at Vandenberg, two new members of the family (both daughters) had been born. Base housing was finally constructed. Cassino was able to move his family on-post and end his long, dreary commute. No ancient Wherry housing here! Vandenberg offered brand new Capehart units—designed like individual suburban homes.

A major decision loomed for Cassino and his family. During his time at Vandenburg, he had begun receiving civilian job offers from several defense contractors—General Electric and Western Electric among them. Their overtures were difficult to ignore. They promised far greater pay, a chance to work on exciting projects, and more stability for his growing family. His wife had always wanted to buy a home. Friends of his who had made similar deals had nothing but good to say about the results. The offers were hard to resist, and they kept coming. Eventually, they were too enticing to ignore.

In March,1959, Cassino prepared a letter of resignation from Air Force active duty. The letter soon found its way to the desk of Vandenburg's 1st Missile Division commander at the time, General David Wade.

Wade's Air Force career included World War II combat in the Pacific, as commander of the 9th Bombardment Group. He was a hardened military professional, unwilling to lose an

officer from his ranks who showed ability and promise. He called Cassino to his office. “Captain, as a reservist you have the right to leave active duty,” he said, as the letter sat on his desk. “I cannot deny you that. However, I have the power to set the date of your resignation. We need you here, so if you proceed I’ll set that date three or four years down the road. During that time, you’ll receive no promotions, nor will you get any more training. Those job offers will dry up.”

“What’s my alternative, sir?” Cassino asked. Though he showed no emotion, his thoughts roiled.

“Today is Friday,” Wade said. “I will leave permission for you to enter my office and retrieve this letter over the weekend. If it is still on my desk when I come in on Monday, I’ll process your request. If it is gone, I’ll forget it ever existed. To be fair, you’re a fine officer and I know you have a family to look after. I can’t make you any promises, captain—but you certainly deserve promotion and I’ll see what I can do for you.”

The following Monday, the letter in question had disappeared from Wade’s desk—as though it had never been written. Still, Cassino’s conversation with Wade may have borne fruit. In June, he was promoted to Major. A career of at least twenty years and the pension that followed was assured.

His family enjoyed their new home for a year and a half more. In September 1961, Cassino got new orders. The family would soon travel to San Antonio, Texas.

Chapter 18: East Versus West

If Wright-Patterson is the brains of the Air Force, Kelly Field is its heart. Kelly is one of the oldest and most famous airfields in the nation. When the Army's first aero squadron took off to help "Blackjack" Pershing chase Pancho Villa into Mexico, they flew from Kelly's runway. Before World War II erupted, Kelly was the place hopeful volunteers (like a younger David Wade) were sent to become Army pilots. Most of the senior Air Corps officers at the start of that war had earned their wings at Kelly. By then, the place was more than just an airfield. It had become an Air Corps tradition.

Until its closure in 2001, Kelly was located several miles south of downtown San Antonio, Texas—the site of every Texan's beloved Alamo. The city is home to three more important military bases. Lackland Air Force Base, where all new airmen still receive their basic training, sits on the other side of Kelly's runway. Fort Sam Houston, site of Brooke Army Medical Center, the Army's largest military hospital, is closer to city center. Randolph Air Force Base, an important flight training center, is located to the north. San Antonio is famous for its river walk, which meanders through miles of paths and tunnels along the banks of the San Antonio River. Lined with shops and restaurants, the river walk is a popular destination for residents and tourists alike.

By the time Cassino arrived, Kelly had gone through many transformations. No longer a training hub, the base was now home to SAAMA—the San Antonio Air Materiel Area. SAAMA was responsible for maintaining and servicing a variety of military aircraft, including (at the time) the B-52 and B-58 bombers. In 1958, the command was given prime maintenance and support responsibility for all Air Force nuclear weapons, including re-entry vehicles, supporting tools, and arming-fusing devices, as well as testing, handling, and training equipment. In short,

any item the Air Force owned that had to do with nuclear weapons was serviced and maintained by SAMMA.

The job was enormous. There were nearly ten thousand nuclear weapons in the 1963 Air Force inventory, and the count was growing. Aside from military personnel, SAAMA kept an extensive staff of civilian engineers and technicians—all devoted to keeping the nation's nuclear arsenal up-to-date, supplied, and serviced. Cassino would become Assistant to the Chief of the Maintenance Engineering Division, Directorate of Special Weapons. All the knowledge he'd developed during more than a decade working with nuclear devices—from the old Mark 5's, Mark 6's, and Mark 7's to the latest B28 and B43 modifications —as well as his experience with missile warheads and re-entry vehicles, would be needed for this assignment.

His first few months at his new job were filled with surprises. Cassino was puzzled to see the amount of engineering work still being done on the nation's oldest nuclear bombs. Engineers were still assigned to models like the venerable Mark 5, even though these were already obsolete and being removed from use. He brought his concerns to his chief. The senior officer, nearing retirement, patiently counseled his new assistant. "These are civilians, Dan," Colonel Waring told him. "Our control over what they do is limited. Their administrative boss is a high-level civilian employee, a GS 15. He outranks me. He tells me that some of these guys have been working on the old bombs their whole careers. It is all they know. If he gets rid of them, he loses headcount, and that means his budget might be cut. So, he keeps them on. From his point of view, they are not doing any harm. Civilian life isn't much like the military," the colonel said, shaking his head. "Sometimes it's more about politics than results."

Cassino understood and did his best to work around the administrative obstacles to get his projects done. His family was moved into Kelly's base housing—some more Wherry

construction, this time of brick. The kids were in school, and the family bought a new car. On the home front, life was calm—at least as calm as teenagers in a house allow.

Disputes were rising at work. Norton Air Force Base—near San Bernardino, California—was home to SAMSO (Space and Missile Systems Organization), an establishment much like SAAMA. SAMSO was charged with maintaining, supplying, and servicing the Air Force's growing missile fleet: today's Atlas and Titan missiles, and the Minuteman squadrons that would take their place in years to come. SAMSO's leaders believed that they should have control over every part of the missiles they managed, which put them at loggerheads with SAAMA. They had powerful support from within the Air Force and the Department of Defense. An administrative fight loomed between the two organizations. A meeting was called to decide the matter in October 1963.

The meeting was heavily attended by high-ranking Air Force officers and civilian Defense Department officials. Cassino attended but had no plans to speak. He brought no slides or notes with him. Presentations began in the morning and lasted through the day. SAMSO's argument carried great momentum—principally due to the importance of the weapons they managed, the intercontinental missiles that were rapidly becoming the nation's first line of strategic defense. At one point, a colonel from SAMSO displayed a glossy, professionally produced chart of missile components his organization supported. It illustrated forcefully how complete their management of the new Minuteman missile had become.

During an afternoon coffee break, Colonel Waring and Cassino compared notes. "It doesn't look good for us, Dan," his chief said. "Their arguments are forceful, and they already had a lot of backing before they showed up."

"I think I can help, sir," Cassino said. "If you can get me five minutes to address the meeting, I think I can change some minds."

"We've got nothing to lose," the colonel replied. "Let me go set things up."

The meeting reconvened. Waring stood. "My assistant, Major Cassino, has a few comments," he said.

Cassino rose, holding a marker in his hand. "Can I use your chart?" he asked one of the officers from SAMSO. There was a puzzled nod.

Cassino moved to the chart. "You've certainly proven to everybody here that you maintain that missile," he said, "except for this." Turning, he drew a small cone at the top of the missile's picture.

"That's what you're missing, gentlemen," Cassino said. "The warhead—and its re-entry vehicle. It has got to be that way. What if every Air Force weapons system had to take care of its own nuclear components? Think of the waste in manpower and equipment. You'd have overlapping authorities from every operational command, most of them arguing over the same bomb design. It would be very hard to duplicate the efficiencies we've built here at SAAMA during the past five years." He nodded and returned to his seat.

The meeting adjourned an hour later. There would be an executive session the next morning, and final decisions announced several days after that. Cassino brushed away his anxiety and got back to work.

He was called to Colonel Waring's office a week later. His chief greeted him with a wide smile. "We won, Dan," he said. "There will be no division of nuclear weapon supervision." The two men shook hands.

"Your presentation had a lot to do with the outcome," Waring continued. "Your knowledge and your ability to think on your feet were important. I am putting you in for a commendation."

Cassino left Waring's office elated. The commendation would be important in a few years when he came up for his next promotion. In the meantime, there was plenty of work to be done. The B28 bombs and the warheads developed from them would soon be replaced by more powerful, more reliable B43's—flexible "dial-a-yield" designs. There were more nuclear devices of all sizes and types than ever before. Proper storage and training were becoming critical issues.

A few months later, Cassino found himself with an important choice to make. His career path called for command time, and for an overseas assignment as well. The Pentagon's decision was to send him to Aviano Air Base, in northern Italy. If he accepted the assignment, he would be put in charge of base munitions there.

He agreed to the assignment immediately. His orders were cut in August 1964. That September, he and his family boarded a flight from Kennedy Airport to Milan—the first leg of their journey to his new post at the foot of the Dolomites.

Chapter 19: The Ammunition River

The big Alitalia jet landed the Cassino family in Milan on a blustery, windy day late in Italy's summer. The hectic search for luggage was followed by a lengthy march through customs—with tired, cranky little girls in tow. An Air Force sergeant awaited them as they left customs. He helped them with their bags and directed them to an ancient C-47 "Gooney Bird" waiting for them on the tarmac at the other end of the airport. The World War II era transport would fly them and a few others to Aviano.

There were few frills in the old plane's cargo bay. The family was strapped into metal seats with webbed harnesses, their luggage piled between them. They were joined by three other passengers, and then by the crew. After checking to make sure passengers and cargo were secure, the pilot and co-pilot climbed to the cockpit and began their pre-flight checks. Soon, the plane started to move. The sound of racing engines vibrated intensely through the fuselage, momentarily reminding Cassino of his last time in these skies. Lumbering down a side runway, the plane found its way to the sky. It slowly climbed in a wide circle until it was a mile above the ground, banked to the northeast, and began its three-hour trip Aviano Air Base.

The flight went smoothly at first. Passengers watched as farms and villages passed below, shadowed in part by clouds above them. They flew toward the northeastern corner of Italy—the province of Udine, where some of the fiercest battles of World War I had taken place. Gradually, the terrain became hilly, and then mountainous, as they reached the foothills of the Dolomites. Now they flew through valleys, and the air became less placid. The old transport began to pitch and shudder.

As they flew further north, the air became rougher yet. Many of the passengers became wide-eyed and pale. Cargo shifted ominously under its webbing. Cassino rose from his seat and

made his way to the cockpit, where he wedged himself at its entrance. “Go high,” he told the pilot. “Gain some altitude! You have got kids back there. Get where the air is smoother.”

The pilot nodded. The old plane climbed a thousand feet. Soon, the hectic swaying and unexpected roller-coaster drops subsided. Cassino carefully moved back to his seat. The flight was almost at its end. They were coming in for a landing.

In what seemed like an instant, they were moving slowly down a runway, then swinging to a stop. Fuselage doors opened. The passengers stumbled from the plane as quickly as they could, to stand dizzy and half-sick on the tarmac. It was a cool, windy, blustery day in Aviano—the brilliant blue sky was marred by scudding clouds. A tall, slim man climbed from a rusty station-wagon parked nearby and walked toward Cassino and his family. His dark blue work uniform showed him to be a captain.

“Major Cassino?” he asked and received a nod.

“I’m Sandy Stauffer, sir,” the officer continued. “We’ll be working together. There’s no guest quarters on base, but I’ve set you up at a hotel in Pordenone. It’s a town a few miles down the road. We’ll load up your luggage and get you there right away.”

Stauffer loaded the tired, giddy family in his old station-wagon and drove them to a small *albergo* in Pordenone, about ten miles from the air base. The hotel commanded a view of the nearby Noncello River, which flowed through the town. Three rooms had been reserved for them there. Cassino saw to the delivery of the family’s luggage, then rode back to Aviano with Stauffer to sign in. He returned two hours later and joined his wife and children for dinner. Everyone was exhausted and turned in for an early evening. Below them the river surged and gurgled, its future significance unimagined.

The next day, Cassino reported for his first day at his new job. That morning he met with the base commander, Colonel Lisle—a tall, slim Virginian with greying hair. “You’re a sight for sore eyes,” Lisle told him. “We’ve been without a munitions chief since your predecessor was passed over for promotion. He’s been gone four months now. Stauffer has tried his best to handle things, but he’s in over his head. There’s a lot that needs to be done.”

Aviano Air Base had a large munitions area. Bombs and ammunition for the constantly shifting “rotational” squadrons—sent from stateside air national guard wings for operational training—had to be stored and maintained. Aviano also stored conventional and nuclear bombs for the aircraft constantly on alert as part of NATO’s shield. In addition to all that, the large U.S. Army base in nearby Vicenza stored their “special” weapons at Aviano. These included nuclear artillery rounds for 155 millimeter and eight-inch howitzers, nuclear demolition devices, as well as warheads for nuclear-tipped rockets and guided missiles.

Taking care of all these responsibilities was a big job. Many of the nuclear weapons had to be stored separately because their components were not compatible. The ammunition and ordnance for the rotational squadrons had to be constantly maintained. Otherwise the guns of visiting aircraft might easily jam. Security was a major concern as well. Cassino noticed immediately that entry and exit control was lax. Gates and bunker entrances were left open, and trucks were casually waved through checkpoints without any credentials checks. Some of the trucks were driven by Italian civilians.

“I thought you might notice that,” Stauffer said. “We’re a little understaffed right now. Anyhow, most of the guards know the drivers by sight. It’s not as though we’re dealing with classified stuff.”

Cassino nodded, but made a mental note to check on the level of security personnel. There was too much at stake here to allow informality.

He was given a quick tour of the ammunition and conventional ordnance bunkers. Everything seemed in order at first glance, although Cassino noticed that none of the facilities he saw were very clean. He made another mental note.

He and Stauffer took a break for lunch before inspection of the nuclear weapons storage bunkers. The two men were checked though security when they returned to the munitions area. Everything seemed in order. The people at the gate knew what they were doing. The bunkers themselves were in good shape. Cassino relaxed a little. Maybe things weren't so bad, after all.

As they left the munitions storage area, Stauffer guided him to what would now be his office, in the back of the adjoining administrative building. The room was big, with a large desk and a nearby conference table, as well as some upholstered chairs facing a couch and a coffee table. Bookshelves lined the back wall. A large window overlooked the nearby storage bunkers. Cassino was impressed. There would be plenty of room for him to work here.

As he tried the chair behind his new desk, Stauffer carefully placed a stack of paperwork before him. "Just admin stuff, sir," he said with a shrug. "You'll need to sign these to take charge of the inventory."

A thick silence pervaded the room as Cassino looked through the paperwork. A sadness settled on him. He turned to Stauffer and slowly shook his head. "Sit down, captain," he said.

Stauffer continued to stand. "The forms are all in order, sir," he said. "I've checked them myself." He seemed nervous.

Cassino stared at the man who had been so helpful to him and his family until now. "I told you to sit down," he said. "I won't say it again."

Stauffer fell into a nearby chair.

"Sandy, you've been kind to my family since we got here. I'm hoping you mean well by giving me this stuff," Cassino said, gesturing to the forms in front of him. "You know I won't sign any of it. Not without a full inventory."

"Sir, be reasonable," Stauffer pleaded. "There's no time. My family's already moved out of our house. I'm due at my next assignment in a few weeks. Anyway, we just had an inventory two months ago. All you need to do is a stock record account review. The paperwork is right in front of you. Then you can sign the certificates of transfer and I'll be on my way."

"Sandy, you'll have to make other arrangements. Until every round of ammunition is accounted for, I don't intend to sign for any of it."

"We all heard the rumors, you know," Stauffer said, his voice cracking with strain. "They said you were a hard ass prick. I'm not going to take it. I'll see the colonel." Face flushed, he started to rise.

"Sit back down, Captain," Cassino said calmly. "I'm not done with you yet. I'll overlook the insubordination, but just this once. Go ahead and see Colonel Lisle. I'll call and tell him you're on your way. In any case, you'd better listen to me. Your only chance to get out of here quick is to get those inventories started. Until they're done, you'll stay in Aviano. Clear?"

It was clear enough. Stauffer stood and saluted. "Permission to leave, sir?"

"Granted," Cassino said, returning his salute.

As the captain stormed from his new office, Cassino picked up his phone. "Base commander's office, please," he told the operator. "I need to speak to Colonel Lisle."

In less than a minute, Lisle's voice boomed through the phone. "Dan," the colonel said, "surprised to hear from you so soon. What's going on?"

Cassino explained the situation quickly. “I see,” the base commander replied. “Well, Stauffer’s right, he was scheduled to leave by the end of the week. How long will the inventories take? How many do we need?”

“We’ll need three,” Cassino replied. “One for the nuclear materials, one for classified manuals, and one for the conventional ordnance. It will take a day or so to set everything up. After that, given the amounts we’ve got stored, the inventories themselves should be done within a week.”

Lisle agreed. “It looks like you’ve got things under control over there,” he said. “I’ll speak to Stauffer when he shows up.”

The next morning, Cassino called a meeting with all of his officers and non-commissioned officers in the main building’s training room. He walked into the room and stood before them, scanning a sea of unfamiliar faces.

“Attention!” The first sergeant bawled.

“At ease, be seated,” their new leader said. “My name is Dan Cassino. I’m the chief of munitions now. Those of you I haven’t met yet will be seeing me soon. I understand my reputation has preceded me, at least with some of you. That’s good. For those of you who heard the rumors, most of them are true. I expect to run this outfit by the book. That doesn’t mean work needs to be any harder than necessary, it just means work has to be done right. It means if you’re not sure how a job needs to be done, don’t guess. Talk to your supervisor, talk to the first sergeant, or talk to me. I have an open-door policy. I will listen to and investigate to any issue you bring to my attention. So, be careful. Once I begin looking into a matter, you may not like all of what I find. I expect your work areas and barracks to be up to military standards. There will be

inspections, starting today. I'm looking forward to my tour of duty here, and to working with each of you. That's all I've got for now, but I'll take your questions."

From a sergeant in the rear of the room: "Any change to pass policies, sir?"

"Whatever's standard for the base will go here," Cassino answered. "If you have specific needs, see the first sergeant."

From a senior sergeant near the front: "We're understaffed, Major. Have been for a while. Any chance for some more people?"

Cassino nodded. "I'm aware of the problem," he said. "I'm meeting later today with the base commander to address it. I'll try my best to get our manpower needs met. We need the help. No promises, though."

The questions continued for the next twenty minutes, from all corners of the room. Cassino could sense that these men were looking for leadership. Finally, he held up his hand. "That's all the questions I have time to answer now. Thanks for asking them. If any more occur to you, bring them to your supervisor, or to the first sergeant. Now, one last thing. There will be a full inventory of all conventional ammunition, beginning at 0700 tomorrow morning. Officers and supervisors, remain in this room to organize and assign responsibilities. The rest of you are dismissed."

With that, Cassino dove into the first meaningful task of his new command. The session went well. The officers and non-comms alike were experienced, and knew what was expected of them. By early afternoon, plans for the inventory were completed. Everybody knew what jobs they had to do.

As the work progressed, Cassino kept an eye on Stauffer. The captain did his part, but seemed detached from those around him. He held lengthy conversations with three sergeants in

particular. Back in his office at the end of the day, Cassino called for his first sergeant—his right-hand man, the section's ranking noncommissioned officer.

"First sergeant, who were those men Captain Stauffer needed so much time with?" he asked.

"Their names are Decker, O'Brien, and Phillips," the first sergeant told him. "All three work with the rotational squadron ammunition. They're in charge of reloading the fighters for their training runs."

"I see," said Cassino. "Please tell those three they won't be needed for the inventory tomorrow. Send them on another assignment."

"Yes, sir."

The next day was busy and hectic. Hundreds of thousands of rounds of fifty caliber ammunition for jet fighter machine guns, as well as hundreds of bombs and rockets were stored in the bunkers—enough to arm an Air Force fighter wing for war, as well as for training missions to the nearby firing range. All these munitions were carefully stored in clean, dry, well-ventilated structures that were half-buried below ground. Every round, rocket, and bomb would have to be counted.

Since the last inventory had occurred only two months ago, the day's work was expected to be perfunctory. Records showing how many rounds were supposed to be in each bunker were compared to the actual physical count. Minor discrepancies were typically explained by damaged rounds set aside for repair or demolition. The work was strenuous and tedious, but not complicated.

So, when unexplained shortages were found in several bunkers, everyone working on the inventory was surprised. By early afternoon, it became apparent that more than ten thousand fifty

caliber rounds were unaccounted for, as well as a score of bombs and rockets. The missing ordnance was not from a single bunker, nor was it limited to a consecutive set of manufacturer's lot numbers. Instead, some came from each of the bunkers inspected. It seemed to have been chosen at random. Something was very wrong.

Cassino took the reported shortages calmly. He had expected problems, but not of this magnitude. "Any chance of clerical error?" he asked.

"Not for shortages this big," he was told.

"How about the flight line? Could the missing ammo be there?"

Again, the answer was no.

"Remember," Cassino was told, "the last inventory was just two months back. An error of a few rounds might be expected—even a few hundred if people were really sloppy. This much difference can't be explained. It's nowhere in the records. The ammunition is missing, unaccounted for."

"Keep working," Cassino said, frowning. "I want a complete, accurate count before I take matters further. We'll double check every number if it takes all night."

It was late in the evening before the last airmen were through with their work and back in their barracks. By then, the official count of missing ordnance had risen to twenty thousand rounds of fifty caliber ammunition, ten two-hundred-fifty-pound bombs, and six air-to-ground rockets. Cassino called the base commander at his quarters.

"Sorry to bother you so late, sir," he said, "but you need to know this. We've just finished an inventory of the conventional ammunition. We're twenty thousand rounds short, with some bombs and rockets missing as well."

"Any chance of a mistake?" Colonel Lisle asked.

"We've checked and double-checked every count, sir. There's no error. The ordnance is missing. I recommend we get the Provost Marshal and the OSI involved right away, while the evidence is fresh."

"Are you still at your office? I'll send someone right over."

"Yes sir, I'm still here," Cassino said. "I also recommend four men for detention immediately. They should be restricted to the base until we get things sorted out."

"Give me the names."

"Three sergeants: Decker, O'Brien, and Phillips; also, Captain Stauffer."

"Stauffer? Are you sure, Dan?"

"Sure enough that I want him where I can find him, sir. He's the first man the OSI should question."

Less than half an hour later, Cassino heard a soft knock on his office door. "Come in," he said. It was late, and he was tired, but this situation had to be addressed.

The man who entered was slim and wore his hair in a short flat top. He was in civilian clothes, but his bearing was distinctly military.

"Major Cassino?" he asked, offering his hand. "I'm Paul Reed from the OSI detachment here. Colonel Lisle told me it was important to get on this right away, so here I am."

Shaking his hand, Cassino offered his visitor a seat. "Agent Reed, I'm glad to see you. I apologize for calling you in so late. We've got a serious matter here. I need your help." Without pause, he explained the results of the day's inventory, and his suspicions about the shortages.

"I believe Captain Stauffer and a group of NCOs are behind the shortages we found," Cassino concluded, shaking his head. "It hurts me to say it, because he and his wife have been very kind to my family since we arrived in Aviano. It's a shame, but I have no choice."

Reed looked up from his notepad. “That’s a strong accusation, Major,” he said. “What grounds do you have to back it up?”

“Stauffer didn’t want the inventory,” Cassino answered. “He argued hard against it, got insubordinate, even took it to the base commander. He seemed to me to be under severe stress. I think whatever’s going on is nothing new. I think several of my NCOs are involved, maybe some Italian nationals as well. If they’d had a while—a year or so, let’s say—I think they would have tried to hide the losses somehow, maybe written them off. They just didn’t have time, only two months past the last inventory.”

“What you’re saying makes sense,” Reed said, snapping his notebook shut and placing it in his jacket. “There’s a lot of black-market activity around here, and some people from the base are involved. Nothing this big, though. Not until now. It’s mostly been food and liquor.”

He rose from his seat. “Thanks for getting on top of this, Major. If you’re right, we might stop a serious crime. We’ll start looking into it in the morning.” Both men left Cassino’s office and went home for the night.

The following weeks were busy—far too busy for Cassino to worry much about the missing ammunition and the OSI investigation it triggered. A technical proficiency inspection of his unit’s ability to work with the nuclear weapons they stored was coming up. Stern warrant officers from Ramstein would soon arrive to check every aspect of Aviano’s nuclear operations with a fine-toothed comb.

Practice was the key to passing these inspections, Cassino knew. He also knew inspected units had to pass. A failure would mean severe consequences for everybody involved, from the base commander down. Two men stood out as far better than average at working with nuclear weapons so far: a tall lieutenant named Brown and a short, barrel-chested sergeant named Gray.

Cassino put them in charge of training the other teams, and began to feel more confident about how events were going.

His desk's in-box quickly filled with the forms the military runs on. Each had to be signed and forwarded—but only after careful inspection of what was being indorsed. Signing without reading was a sure way to end a career. Here was where a good first sergeant was a needed, and Cassino was blessed with one of the best. Senior Master Sergeant Eli Coombs had spent his last twenty-two years in the Air Force—and the Army Air Corps before that. He had loaded bombs into B-24's in North Africa and France, B-29's in Korea, and the screaming jets that replaced them since. His knowledge of the ordnance his unit cared for, the regulations that applied to their use and storage was encyclopedic. He was one of the quiet, hardworking corps of senior non-comms that keeps the Air Force running. He kept the enormous volumes of files in order, and made certain nothing got to Cassino's desk that could harm him to sign.

A bond quickly grew between the two men. After just a few weeks, Cassino could sense tension giving way to calm regularity. Any doubt he had about his fitness for this assignment was quickly dissipating. He moved his family from their temporary quarters to a rented pensione, just a few minutes' drive from his work. Rumors floated through the munitions section about what had happened to Captain Stauffer. Some said he had returned to the U.S. Others whispered that he was still on base, under detention. Cassino ignored all the gossip, preferring to concentrate on his job.

Six weeks had passed since the inventory and its discoveries. Cassino was only slightly surprised when his first sergeant announced the arrival of three unannounced visitors: OSI Agent Reed and a pair of officers from Ramstein Air Base, U.S. Air Force Europe Headquarters. The

visitors were ushered in. Reed's companions turned out to be JAG (Judge Advocate General) officers, a colonel and a major. Their topic was the missing ammunition.

"We found it all, Dan," Reed said. "We found the missing munitions. Stauffer talked the minute we began interviewing him. We've rolled up the sergeants who were in on it with him, as well as the Italians."

"You had a big ring operating here," the JAG colonel said, shaking his head. "Munitions, electronics, liquor, food, even drugs. There were more than twenty people involved, mostly locals. We've turned the Italians over to the Carabinieri. General courts martial for the U.S. military involved. That involves three of your sergeants, major, as well as Captain Stauffer. Your base commander, Colonel Lisle, has already drawn up the paperwork. Stauffer and the others will be on their way to Ramstein with us."

"Where was the missing ammunition?" Cassino asked.

"They sank it," Reed said. "They wrapped it in rubberized canvas and sank it in the Noncello River, right in the middle of Pordenone."

Cassino smiled ruefully. "I could probably have seen it from the hotel I was in," he said.

"Probably," Reed agreed. "Dan, your inventory cracked the whole case wide open. If it hadn't been for you, these guys would have had time to cover up the ammo theft. We might never have caught them."

"How much money did they make from what they took?" Cassino asked.

"That's the sad part about all of this," Reed replied. "These people never make much. Stauffer and the other three probably netted less than fifty thousand dollars U.S."

After the men left his office, Cassino sat silent, considering what had just gone on. It was unusual to have more than one jarring event during a tour of duty, he thought. With any luck, his was behind him now. He couldn't have been more wrong.

Chapter 20: Need to Know

Fall in the Dolomites turned to winter. Snow painted the mountains around Aviano, and covered the farmers' fields around the base. Officers' promotions were announced. Only one field-grade officer was elevated: Dan Cassino, from major to lieutenant colonel. Congratulations from others at the base was muted at best. Stauffer had been popular at Aviano, and some still faulted Cassino for the disaster that befell him. Others had expected promotion but had been denied. Major Harry Reiss, who ran Aviano's maintenance operations, was one of these. Over cocktails with others, he openly disputed the validity of Cassino's change in rank. "He sits over there like a king," Reiss said more than once. "He doesn't let anybody see what's going on."

Reiss had become annoyed when he attempted to follow one of his work crews into the nuclear weapons storage area. The men had been sent in to repair a bunker wall. They were allowed to enter—under strict supervision. Reiss was not. He complained to Cassino.

"How can I be sure my men are doing a good job?" he asked.

"I'll let you know," Cassino answered calmly.

"What's in there I can't see? I have a top-secret clearance."

"You're not Q cleared, Harry. Even if you were, you've got no need to know what's in that bunker, or any of the others back there."

"Maybe I'll just ask my men what they saw."

"They won't see anything, Harry. We covered everything sensitive with tarps."

"Then why can't I go in, too?"

"Because you have no need to be there."

A call came in on Cassino's phone. He turned away from Reiss to take it. Understanding, finally, that he was not going to get his way, the base's chief of maintenance departed.

Reiss would not let the matter drop. He brought it up when he and other officers left for a boar-hunting expedition to Greece—a trip on which he'd made sure Cassino was not invited. He brought it up at staff meetings. He brought it up, from time to time, over dinner with his family. Harry Reiss was a stubborn, angry man who liked to get his way. He hated to be thwarted. Those around him knew he wouldn't let things rest.

The object of his disdain did not care. Cassino filled his time bringing Aviano's munitions section up to his standards, which were high. Sloppy uniforms, sloppy work areas, sloppy barracks—all these were in the past. Cassino reestablished weekly inspections. Those who did not meet his standards were not issued passes or became subject to other discipline. Cassino believed that people who have pride in themselves and their work do a better job.

Life among the enlisted ranks of the Air Force then was far removed from what men at war may experience. Most of the airmen had mundane, clerical jobs. Their workloads weren't often heavy. As long as they performed adequately, supervision was seldom a burden. Only a few worked on the aircraft themselves, or the components of those aircraft. For most, the tedium they experienced was overshadowed by the fact that they were in beautiful Italy instead of places like Vietnam or Korea.

Like all military installations, Aviano Air Base got inspected often. Some of these inspections were scheduled—often months in advance. Others were a complete surprise. Readiness inspections could occur any time of the day or night. When the inspectors from Ramstein showed up, the clock began ticking. The base had only a limited time to prepare for and launch a strike, as though a real war had begun. Failure to launch that strike would almost always mean the base commander would be sacked. Other careers would suffer as well. No one treated readiness inspections trivially.

Because phone service was limited outside the base, the first notification of a readiness inspection was always the sounding of the base siren, which stood outside the officer's club. Immediately after that, a helicopter would take off to broadcast the news by loudspeaker up and down the Po Valley. Those lucky enough to have phones would be called. The base would go to alert status, while those involved planned and executed the mission given them by inspectors. Events weren't always allowed to go as intended. In one case, the team from Ramstein stipulated that the road from munitions bunkers to the flight line was blocked—preventing ordnance from reaching the waiting jets. Cassino solved that problem by knocking down the security fence between munitions and the flight line, and driving his trucks overland to their destination. The solution was expensive—a large section of fence had to be replaced—but the goal was accomplished.

The inspectors could be sneaky. On one occasion, they began their alert exactly at noon—at the same time the base siren always howled to announce the midday. Many on the base continued their normal duties, unaware that an alert had been called. It took fifteen minutes of valuable time to get everybody's attention. The base barely met its time limit.

Inspections, alerts, training issues, personnel problems—these were the bulk of Cassino's professional life at Aviano. As time went by, he adjusted to them and grew more confident in his ability to direct the work that challenged him every day. The weapons he managed were potentially some of the deadliest mankind had ever conceived, but they sat inert in their bunkers and caused little concern—as long as they were inspected and maintained. The men who serviced the ammunition, bombs, and weapons were a greater challenge. Their personal needs and histories could lead to unexpected events and difficulties. No two days managing his section were the same. Still, there were no events or problems a competent officer could not control.

Cassino felt at ease with his responsibilities. After working most of a gloomy Saturday in November 1965, he decided to ignore the overcast skies and take his youngest son with him to the base golf course. They would hit some balls at the driving range.

Chapter 21: The Nuclear Weapons World in 1965

Aviano Air Base is part of a massive global nuclear war fighting force in 1965. The base is part of NATO—the North Atlantic Treaty Organization—with ships, aircraft, missiles, and ground troops stationed from the British isles to Norway, from Spain to Turkey. Opposing them are the forces of the Soviet-backed Warsaw Pact, arrayed throughout eastern Europe—from East Germany through the Balkan states. Among the NATO allies, France, Great Britain, and the United States can field more than 31,600 nuclear weapons that year—a total that will grow even more in the years ahead. The Soviet Union's nuclear stockpile is smaller, at 6,100 weapons, but destined to grow substantially in the future.

By November 1965, the U.S. strategic nuclear arsenal is fielded, in place, and vast. A "triad" of more than two hundred land-based missiles in hardened silos, 750 manned intercontinental bombers on constant alert, and dozens of submarines capable of launching nuclear-tipped intercontinental missiles, all target the Soviet Union and her allies. The last decade's "bomber gap" and the more recent "missile gap" were both real—but attributed to the wrong side. The United States alone has built a far more dangerous nuclear force than her global opponents.

Nor do strategic nuclear weapons tell the whole story. In 1965, the U.S. fields a large array of tactical nuclear weapons as well—from bombs mounted on shorter ranged aircraft (like the ones on alert at Aviano) and Army tactical missiles, to nuclear artillery rounds, land mines, anti-aircraft missile warheads, naval depth charges. There is even a man-portable device—the B54—developed to allow nuclear "special missions." Weighing less than one hundred pounds, the B54's yield can be set as great as a kiloton (equivalent to two thousand pounds of TNT).

Though their weapons count remains dwarfed by the west, Soviet nuclear forces cannot be discounted in 1965. They can launch hundreds of Bear, Bison, and Badger long-range bombers at targets across Europe. Some of their planes have the range to hit U.S. cities and military bases as well. The Soviet Army controls thousands of shorter-range weapons as well, capable of sweeping aside NATO formations struggling to oppose them. With more than six thousand nuclear weapons available, the Soviet bear is well provided with both tooth and claw.

The United Kingdom used the knowledge gained from collaboration with the Manhattan Project to begin her own efforts after World War II ended. The bleak Monte Bello Islands off Australia saw detonation of Britain's first successful nuclear test in 1952. By 1957, thermonuclear blasts were part of the GRAPPLER X tests. The first Blue Danube atomic bombs were delivered to the RAF in 1953. By 1965, twenty squadrons of nuclear-tipped Thor missiles are operational. These support a "V-Bomber" nuclear force with 150 modern jet bombers. Soon, submarine-launched missiles will further strengthen this array. A total of more than four hundred nuclear bombs sit in British bunkers.

France's *Force de Dissuasion* bomber fleet (called by some the "*Force De Frappe*") is armed with almost three dozen domestically developed nuclear weapons in 1965. Under the leadership of Charles De Gaulle, France has conducted more than two hundred nuclear tests in Algeria and French Polynesia. The French nuclear weapons program initially cooperated closely with Israel, in order to make use of the newer nation's scientists. Later on, this collaboration ceased to be so intimate, but still exists. When Israel's and South Africa's atomic bomb programs bear fruit, their "French connection" will have been important.

Nuclear proliferation has continued around the world. China detonated her first atomic device at Lop Nor in 1964, and will explode a thermonuclear weapon there in 1967. Even now, she has a handful of atom bombs in an arsenal that is destined to grow far larger.

Israel is reported to have conducted her own nuclear tests under the Negev Desert in 1963. By 1967, Israel will begin producing her own nuclear weapons.

The delivery of a U.S. reactor has enabled South Africa to begin plutonium extraction. Six gun-type fission weapons will eventually be manufactured in the 1980's, before the program is terminated.

India has begun producing plutonium recently. "Smiling Buddha," that nation's first nuclear test, will take place in nine more years—followed by development of a growing arsenal of nuclear weapons and the missiles to carry them.

More nations have at least investigated the idea of developing their own nuclear weapons. Brazil, Argentina, Italy, and Sweden are all known to have accomplished at least some preliminary research. In years to come, even poor nations like Pakistan and North Korea will expend precious resources to build their own nuclear bombs. Though expensive and resource consuming, the development of nuclear weapons has been proven to be within the reach of any government willing to exert the will to have them.

Still, in 1965 only a handful of nations stockpile these terribly destructive, poisonous weapons. Only two—the United States and the Soviet Union—have weapons counts sufficient to threaten the rest of humanity. Nuclear weapons have made the world a very dangerous place in 1965—but not nearly as dangerous as it is today.

Chapter 22: NEST

Dieter Klempf puts away his notes as his C-135 circles to land at Dover Air Force Base just after twenty hundred hours, eastern time—a little after eight o'clock in the evening. He and the NEST he leads have been flying more than four hours, since boarding their plane at Kirtland Air Force Base, near Albuquerque. Here they'll refuel and get a new pilot. It's a chance to leave the plane, to stretch his legs. The team is tired from the preparations they've made all afternoon as well as during the flight east. He's slept, but not much. The problem his team now faces is too serious, too concerning.

This could be a disaster, he knows: the one they can't fix. The bomb in Aviano is big enough to blow a big chunk out of Italy. The reports he's gotten lead him to believe the fuse is already operating. The B43 can explode at any time. He silently curses the young pilot for his stupidity, and hopes the idiot will be nearby if the damn thing goes off. Time is against them. They still have to cross the Atlantic and half of Europe to help the men struggling with a nuclear nightmare. Flight time will be nine more hours at least. Klempf doesn't think the bomb will wait for them.

He turns to look at the three men with him in the big transport jet—the other members of his team. They are all so young, journeyman physicists out of Caltech and MIT, working for Sandia on weapons still on the drawing boards. This is the first NEST assignment for two of them. The prospect is exciting, and they talk in animated whispers among themselves. Klempf hopes they've taken the time to read their notes on the emergency. Otherwise, they'll be almost useless to him when the NEST finally gets to the incident site.

Klempf is a small, compact man with thinning blonde-grey hair and piercing blue eyes. Physics and the mysteries of the atom have been his life's work since he graduated from the

Ludwig Maximillian University of Munich, shortly after the beginning of World War II. He worked under Heisenberg during that war, then was scooped up and shipped to the U.S. via Operation Paperclip. By now, the high desert of New Mexico has thoroughly baked him, and his English carries almost no accent at all. His initial work with Teller and Ulam got him a good job with Sandia, and he has managed to keep his dosimeter clear of too much radioactive exposure so far.

Everyone in the NEST is familiar with the B43, now becoming the most prevalent nuclear bomb in the U.S. inventory. Klempf is also thoroughly acquainted with the PAL device, which he helped develop at Sandia. For its time, the PAL mechanism is a wonder of electronic ingenuity. A self-contained nuclear power source protects it from external variations in energy. It is very well designed—almost foolproof. Now it has done its job far too well. Thanks to the thoughtless tinkering of a bored pilot, it has set in motion gigantic forces unlikely to be stopped. Based on what he knows, Klempf does not believe this bomb can be successfully deactivated.

He does not tell his team-mates of his concerns. It would be unwise to let his dark misgivings upset their attempt to save the situation. The four of them will have to try every option, every possibility, to prevent a nuclear explosion. He will not condemn them to failure by infecting them with his private doubt.

Klempf stands alone on the tarmac, waiting for the plane to refuel. It is early in the evening here. The stars are coming out, he notes. They'll be in Aviano in eight hours. He wonders if this will be the last starry night he'll ever see.

In Aviano, Randy Simms remains in his detention cell, laying in the dark on a cot. Sleep eludes him. His eyes remain stubbornly open. He listens to the noises that whisper through the

building around him—muffled speech, people walking, a typewriter's angry peck. He is lonely and frightened, with a need to talk to somebody, anybody. The minutes pass, becoming hours. No one opens the door to his room to address him. He doesn't suppose anyone will, until it's time for breakfast.

The last person he saw was a captain from the Judge Advocate's office, who gave him some more paperwork to sign and briefed him on his rights under the uniform code of military justice. Randy asked the man what was going to happen to him, but got only a stare and a shrug. "We don't know yet," the man said, then collected his papers and left.

Randy thinks about his father, and his desperate need to talk to him. Dad has none of his own glib friendliness, Randy knows. Not by a long shot. The old man punched his ticket in the Pacific during World War II. He is as harsh as sandpaper unless he's selling cars. Then he miraculously turns into everybody's best friend. It is something to watch.

He wishes his father were here, right now. Dad would read him the riot act, he knows. Playing with that dial had been stupid. Then he would work to get his son out of trouble. If dad were here now, Randy knows everything would be okay. The young pilot finally drifts off to sleep, with that thought in his mind.

In his office near the Aviano flight line, Major Harry Reiss hangs up his phone. Colonel Lisle hadn't told him anything, except to follow Cassino's orders. "Do what he says, Harry," the base commander advised him. "This is a serious situation."

Reiss grimaces in frustration. This is Cassino again, lording it over everybody else, pushing him out of the way! He needs a way to trump the bastard, to show the colonel he is more important and useful. He has to think. If the situation is serious—no matter what it is—there'll be

brass from Ramstein arriving soon. That thought gives him an idea. He picks up his phone to make another call.

At Dover Air Force Base, refueling is completed and the new pilot has arrived. The NEST members re-board their plane. The new pilot hands Klempf a message as he climbs aboard. The munitions crew at Aviano is going to attempt to remove the umbilical cable that connects the bomb to the aircraft. Klempf nods brusquely. They'll know for sure whether the bomb is fully activated very soon.

Chapter 23: Cable News

As Cassino and Gray cross the tarmac toward the tarp-shrouded Phantom, a strange sight materializes in front of them. A large group of airmen—at least fifty—walk slowly forward in a wide line that crosses the flight-line. Each man carries a canvas bag. They are supervised by a trio of sergeants. Cassino approaches the sergeant closest to him. This is a distraction and will take up valuable time, but it has to be dealt with.

"What's going on out here, Sarge?" He asks as he nears the line of men.

"Evening, sir," the sergeant says as he salutes. "We got a police detail out here, cleaning up the area. Orders from Major Reiss. He says there's brass on the way here from Ramstein, and he wants the flight line to look sharp."

"Sergeant, get your men together and get them off this flight line, as fast as you can," Cassino says. "All of you need to get back to your barracks right now. There's a serious situation going on here."

"What about my orders?" The sergeant asks.

"I'll square things with Major Reiss," Cassino answers. "The important thing for you, right now, is to do as I say."

The sergeant salutes and rushes away. Soon he and the other men have vanished from the area.

"You're going to have to wait another a minute, Sergeant Gray," Cassino tells his companion. "I'm going to have to find a phone and make a call."

The phone rings just as Harry Reiss is rising to leave his office and go home. This has been a long day, but in the end rewarding. He is sure that the flight line is pristine by now. He

has sent his most trusted sergeants out to make sure. Colonel Lisle will notice and be pleased. He walks back to his desk and picks up the phone. “Major Reiss,” he says.

“This is Colonel Lisle,” says the voice on the other end of the line. “What’s going on out there?”

“Nothing much, sir. I was just leaving for the day.”

Silence follows. Reiss wonders momentarily if the phone has gone dead. Then he hears the base commander sigh. “I understand you put a clean-up squad out on the flight line. Is that true?”

“Yes sir,” he answers cheerfully. “The place will look sharp when the inspectors get here.”

“What inspectors are you talking about, Major?”

“Well sir, I figured, with all the activity …” Reiss’s voice tails off. Something is wrong.

“Were you told to police the flight line?”

“No sir, I just thought …”

“You put those men in jeopardy, Major. Weren’t you told to evacuate the flight line?”

“Yes sir, but …”

“Get over to my office. Right now. No, wait. Have you got any other men out there on the flight line?

“No, sir.”

“Good. Now, make sure the whole area is evacuated. The whole flight line, do you understand? The only people who will remain are the men in the tower and Colonel Cassino’s people. Is that clear?”

“Yes, sir.”

"Good. Once you have made sure everybody is off the flight line—and I mean everybody—get over here and report to me. Is that clear?"

"Yes sir. Colonel, can you tell me what's going on?"

"I won't, Major. Not on this line. It's not secure. Just follow your orders and get over here."

Before Reiss can answer, the base commander hangs up. The maintenance chief wonders again what could be happening on his flight line, even as he hurries from his office, more worried than ever.

"That didn't take long," Sergeant Gray remarks, as Cassino walks to his side.

"It took time we don't have," his chief answers gruffly. By now the sun has set. They walk in gathering darkness to the canvas-enclosed revetment. Security guards check them through the perimeter. They stand for a moment, staring at the big jet and the bomb hanging beneath it—a bomb that may be alive.

They walk to the Phantom II, to the umbilical cable that runs from a connector slot in the bomb's metal skin to a similar connector in the aircraft above it. The cable is about half an inch thick, and seems completely innocuous.

"Here's what we'll do," Cassino says, turning to Gray. "You get a pair of insulated gloves from the cart. I'll get some long-necked pliers, and hold that cable steady. When I tell you, yank the cable free from the plane, drop it and get away from it as quick as you can."

Gray nods. He dons a pair of thick, insulated gloves. Cassino picks up a pair of large, long-necked pliers.

The men approach the plane. Cassino seizes the cable with the pliers. "Now!" he says.

Gray pulls the cable's connector away from the aircraft, then immediately drops it and jumps back. The cable sparks and writhes. The intense odor of ozone fills the air, now lit by a thrashing arc of electricity.

Cassino carefully uses the pliers to pull the cable away from the plane, but the arc of raw energy continues as it falls to the ground, singeing the fuselage. Cassino uses the pliers to yank the cable from the bomb as well, finally stopping the wildly arcing electrical discharge.

Both men look at the cable, now lying on the ground beneath the plane like a dead snake. "No question now. The bomb's activated," Gray says, shaking his head as he removes his gloves.

"No question," Cassino agrees. "The damn thing arced ten feet or more. That came from the bomb's internal power." He returns the pliers to the cart.

"I want to go over what we know and what we can do," Cassino says. "We need some more help. Tell the guards to let Lieutenant Brown through. Get someone to bring with him. Who's another good man? Who would you recommend?"

Gray thinks a moment. "Bender's good, sir," he says. "He's not married, either."

Cassino nods slowly. "Airman Bender is a good choice. Go get him. We'll need some more equipment here as well, and the fusing manual. Meanwhile, I'll get a message to the NEST. They need to know what we're doing, just in case ..."

He leaves the rest of the sentence unsaid.

Harry Reiss is in no hurry to see the base commander. He knows he has somehow caused trouble, but can't determine how. He decides the whole thing is Cassino's fault, and that's what he will tell Lisle. He carefully checks each bay and hangar on the flight line, even though he knows most will be empty by now. It is after all past twenty hundred hours on a weekend.

Finally, with no reasonable way to delay further, he gets in his car and drives to the base headquarters building.

The building is quiet and dark. Only the duty officer and a few others should be here. The lights in Colonel Lisle's office blaze bright, however. Reiss's shoes click noisily as he walks down the dark linoleum hall. He doesn't know what's going to happen, but he has a feeling he won't like it. He knocks on the door to Lisle's office.

"Come in, Major," Lisle booms in his Virginia drawl. As Reiss enters the base commander is sitting at his large desk—not a good sign. When he is in a good mood, Lisle meets his guests while sitting on the sofa nearby.

Reiss salutes formally. Lisle beckons him to sit. "Major Reiss," he says, "do you normally follow orders given to you by a superior officer?"

"Yes, sir," Reiss replies. "I didn't understand …"

"Yes," Lisle interrupts, "you didn't understand. There is a very serious situation taking place at the flight line. You were told to evacuate it, were you not?"

"Yes, sir, I was. But …"

"You did not evacuate the flight line, did you?"

"No, sir. Not just then. I thought …"

"Major, when I tell you there is a serious situation on the flight line, what do you think I mean?"

Reiss tries to calm himself, to think rationally. This is not going well. "Sir," he says, squirming in his chair, "serious to me means someone hurt, or equipment damaged. Or both. Maybe a fire, or some kind of accident."

Lisle shakes his head. "Major, have you ever heard of NAICAP?"

"Yes, sir. Yes, I have. Something to do with nuclear, isn't it?"

"It's a nuclear incident, Major. A nuclear incident. We're having one right now, on the Aviano flight line. That's why you were ordered to evacuate your men. Now do you understand?"

"Why didn't somebody tell me? If Colonel Cassino had told me, I'd have understood." He's been right all along, Reiss thinks. This is Cassino's fault.

"Because you have no need to know, Major," Lisle says. "Colonel Cassino could not tell you. He was under orders not to tell anyone. I am too. I shouldn't have told you. You are not to tell anyone else. Is that clear?"

"Yes, sir."

"When I tell you to keep this to yourself, take me seriously, Harry. If I find out word has gotten out and that you're responsible, you will be in serious trouble. Do you understand?"

"Yes, sir. Don't worry about me."

Colonel Lisle stares at Reiss for a long moment, then nods. "All right," he said, "that's it. Go home. If God wills it, I'll see you on Monday for the staff meeting. You're dismissed."

Reiss rises, salutes, and hurries from the base commander's office. Thoughts whirl through his head. Lisle's rebuke is all but forgotten. Nuclear. That means a bomb. One of the alert planes. They carry them. He runs to his car, his thoughts focused on getting as far away from Aviano as possible.

Chapter 24: A Trip to the Beach

The C-135 flies through dark, cloudy skies high above the Atlantic. Dieter Klempf lights a cigarette. He seldom smokes unless he's nervous. He is nervous now. The plane's pilot has just handed him a message from Aviano. The munitions crew there has removed the umbilical cable between the aircraft and the bomb. Electricity arced more than ten feet. The bomb is alive, fully activated. Nothing stands between the men on the ground and oblivion. He passes the message back to the other NEST members. The plane will be over Aviano within six hours or so. Klempf wonders whether they'll find a runway or a glowing crater when they try to land.

Harry Reiss rushes through the door to his family's pensione, which sits on the second floor of a block-long apartment building in Aviano town. His wife Marge looks up from the book she is reading. She is a stolid blonde of fading beauty with large, active oval eyes. Marge has many friends among Aviano Officers' wives. "Where have you been, Harry?" she asks. "I couldn't wait dinner any longer. The kids were hungry. Shall I heat something up?"

"Where are the kids?" Reiss asks, looking through the apartment. "Are they here?"

"Well, Joan is over at Leslie's house. Frank is out with his friends, at that little bar down the block. Larry is here. Why …"

"Send Larry after them. I need everybody home. We need to pack. We're going to Lignano. Right now!"

Four men stand around the equipment cart, peering at the open manual illuminated by their flashlights. The Phantom II alert jet looms behind them. Cassino speaks first. "According to what I'm reading here, we should be able to remove the fuse. First, we'll have to change the

settings to these pins," he says, pointing to the manual. "Once that's done, we can take it out. Then we can seal the opening with a plug, and the bomb should be much safer than it is now."

"We'll have to watch the connectors here and here," Brown adds, finger on a diagram.

Bender, who has joined the other three, looks perplexed. "Do we have to stand so close to this thing, sarge?" he asks Gray. His brown eyes dart around the canvas-curtained area, wide with distress. The airman looks younger than his twenty years. Prominent freckles and the russet hair that frame his round face give him an almost child-like appearance. Even so, Bender is big and quick. He has shown an aptitude for work with nuclear weapons.

"It wouldn't matter if we were a mile off, airman," Gray says quietly. "The Colonel knows what he's doing. Listen to what he tells you. We'll get out of this just fine."

"OK, no reason to wait," Cassino says. "Any last questions?"

Nobody speaks.

Cassino walks slowly to the front of the bomb. The others follow and stand around it, looking down at the fuse. Except for breeze rustling the wet canvas around them, there is absolute silence in the area.

"Alright," Cassino says, "who's got the best hands? Lieutenant Brown, that would be you. Take the Allen wrench and reset the first fuse setting—the one on the top. Airman Bender, hold the flashlight so he can see what he's doing."

Bender stands, legs wide apart, holding the large flashlight in both hands to steady it. Brown picks up the Allen wrench and inserts it into the adjustment slot. "Turn it left all the way, Jonas," Cassino says in a low voice, almost whispering. "Take it slow. Ah, that's got it."

Brown removes the wrench from its slot and stands back. He wipes his brow. Even though the night is cool, he is drenched with perspiration.

"Halfway there," Cassino says. He hands Brown a small screwdriver and points to the grooved head of a screw, mounted flush with the fuse face. "Now rotate that screw to its upper setting, the one marked 'D'."

Brown slowly twists the screwdriver, his concentration fixed on its movement. He is careful only to apply the pressure needed to make it move. Too much might torque the screw to an incorrect setting, and disaster. In a minute he is done. He steps back, breathing heavily. A wave of speechless elation passes through the four men. They are still alive.

Cassino, who has been crouching to watch Brown's work, stands up. "OK, that's that," he says. "Now Sergeant Gray and I are going to remove the fuse from the bomb. Lieutenant Brown, get the plug for the fuse opening, prepare it, and bring it here. Airman Bender, keep that flashlight steady."

Jonas Brown quickly moves to the equipment cart and finds the plug for the fuse opening—a solid conical metal casting topped by an eye-bolt. Its base is threaded for insertion into the bomb. Donning a pair of latex gloves, he opens a small bottle on hand and paints the plug's threads with the chemical from the bottle. This is trichloroethylene, applied to make sure no sparks can result from seating the plug into the bomb.

Once the "trike" has been allowed to dry, Brown carefully carries it back to the area near the bomb. He nods to Cassino. "The plug is prepared," he says.

Cassino looks at Gray. "OK, sergeant, this is it," he says. "I'm going to detach the fuse from the bomb. You watch those connectors. If they look like they're slipping, let me know. Once the fuse is off, take it to the tray. Then we'll emplace the plug."

With agonizing deliberation, Cassino begins to rotate the fuse. He stops several times to wipe perspiration from his hands. Gray calls for Bender to bring the flashlight closer, so he can

better watch the movement of the connectors as they become visible. Slowly, slowly, the fuse comes loose, and then finally free. Gray takes it from Cassino's hands as it separates from the bomb. Brown moves closer, crouches, and inserts the plug, slowly rotating it into the opening left by the fuse. The whole operation has taken less than ten minutes. It seems to the men involved as though hours have gone by.

The team moves away from the bomb. Cassino shakes each man's hand. "You've done good work tonight," he tells them. "Sergeant Gray, you and Bender get to the comm shack as quick as you can. Get a message to the NEST. Tell them we have removed the bomb's fuse and intend to unload it from the plane. Wait for their response and bring it back to me."

Lignano Sabbiadoro is a beach community in the northern region of Italy's Adriatic coast, south of Venice and about a three-hour drive from Aviano. The beautiful beaches of its Riveria section attract tourists from across Europe. The town was home to Italian mystery writer Giorgio Scerbanenco and boasts one of the largest marinas in Europe, with more than five thousand moorings. The U.S. military from Vicenza and Aviano have long reserved beachside hotel accommodations for service members here for weekend or even longer visits. As is true at beach communities all over the world, the hotel receives little traffic during the cold late fall and winter months.

That said, the slumbering staff of Albergo Orchidea is surprised to be awakened at midnight by a U.S. Air Force officer and his family, parked in the plaza beside the hotel, demanding rooms for the night. No sooner does one arrive, then another, and another after that. Within a few hours, the small hotel is filled with families from Aviano Air Base.

Harry Reiss watches the cars roll in from the balcony window of his second-floor room. He turns to his wife, who is reclining on the bed trying to finish her book. “Marge,” he asks softly, “you didn’t tell anybody else about what’s going on, did you?”

Marge puts down her book and stares at him, wide eyed. “Of course I did, Harry. I had to call Olive, she’s my best friend. And Lydia too. Don’t they have a right to know?”

Reiss watches the line of cars on the street below. Marge called Olive and Lydia. How many people have they contacted? Bleakly, he remembers Colonel Lisle’s warning. “I wish you hadn’t done that,” he says with a sigh.

Marge has risen from the bed. “Olive promised she wouldn’t tell another soul,” she says. “Except Bart. My God, Harry, he’s her husband. He’s a colonel. He helps run that base. Shouldn’t he know what’s going on?” Scowling, she marches around the room, collecting her belongings.

“I’m not going to have this argument,” she says. “I’m tired, and the drive gave me a headache. I’ll just tell the front desk to get me another room.”

Reiss continues looking out the window. “You’re too late,” he says sadly. “I think the hotel is full.”

Gray stands in Aviano’s comm facility, waiting for an answer to the terse note he has sent the NEST in flight. The note reads, “Removed fuse. Replaced with plug. On your approval, will detach device from aircraft and move to safer storage. Please reply.” Bender waits outside in a truck.

It takes the communications techs several minutes to encode and transmit the note. “Lots of traffic tonight,” says one of the techs through the enormous wad of gum he is chewing. “Something heavy going down?”

“Just a drill,” Gray replies, forcing himself to smile. “You know how these things go.”

The comm tech rolls his eyes.

The co-pilot hands the note from Aviano to Klempf on a clipboard. “I’ll have a reply in a few minutes,” the NEST leader tells him.

He calls his team to him. “The team in Aviano is very good,” he says to his three companions. “They have been able to successfully remove the bomb’s fuse, and replace it with an inert plug.”

“Isn’t it safe now?” asks one of the young engineers.

Klempf shakes his head. “Sadly, the bomb is as dangerous as ever. Even more so now because no fuse is in place to prevent its detonation. Any movement, any severe shock, might initiate the Tsetse primary. Whatever they do, they must be very careful. What shall we tell them? Any ideas?”

Norcross, who has had more experience than the others, speaks first. “They should leave the bomb where it is until we get there. No one should get anywhere near it.” The other two NEST engineers nod in agreement. Until now, this assignment has been an adventure. Even the long flight from Albuquerque has been exciting. Now, flying toward an armed thermonuclear bomb that is ready to explode, they are beginning to realize the magnitude of their task.

“I would agree with you,” Klempf replies, “if they were in a more controllable environment. They are not. They are on an Air Force flight line. People, vehicles, even aircraft

might move in the area. There is an Italian Army tank training center less than a kilometer away." He runs his fingers through his hair. "Every minute the bomb sits there, it is in more danger of exploding. All the circuits remain activated. The PAL device has seen to that. We must give them useful advice."

The comm tech hands Gray the NEST response to the team's note. He stuffs it in his pocket without reading it, and rushes back to Bender in the waiting truck. "Back to the flight line, as quick as you can," he says as he slips into the truck's seat.

Bender wastes little time returning to the incident area, even though common sense tells him he should be driving as fast as he can in the opposite direction. He and Gray quickly leave the truck and process through the security perimeter, where Cassino and Brown wait for them.

Gray hands Cassino the note, which the munitions chief reads, frowning. "We need to talk this over," he says to Gray. "Go get Lieutenant Brown and we'll meet by the equipment cart."

When all have gathered, Cassino speaks. "You have all done exceptional work tonight," he says, looking carefully at each of them. "It should have been enough, but the NEST experts tell me It's not. The bomb is still activated. The slightest jolt or vibration could set it off."

"What more can we do?" Brown asks.

"There is a control box," Cassino tells them. "Think of it like the circuit breaker box in your house. If it's deactivated, the bomb will be safe to move."

"OK," Gray asks, "how do we get to it?"

"According to the NEST, we'll have to remove the fuse plug we just put in," Cassino explains. "The face of the control box is located about six inches further inside the device. If our tinkering does not set the bomb off, we can maneuver a wire to the control box face."

"What then?" whispers Brown.

"Then we may all die," Cassino says. "We've got to send a damaging pulse of electricity through the wire we've run. If we're lucky, the pulse will disable or destroy the control box. In that case, no power can get to the shaped charges which cause the initial implosion. The bomb will be dead."

"What's the downside?" Brown asks, even though he already knows the answer.

"If the pulse doesn't destroy the control box, it may activate it instead. Then we'll all cease to exist."

"I won't order any of you to stay here for this," Cassino tells the men around him. "I will need one of you to help me, because the two-man rule still applies. The other two can leave. You have already done more than your share. Any volunteers?"

The three men look at each other, then all slowly nod. "What the hell," Brown says, "I can't get far enough away anyhow."

Cassino nods as well. "OK, let's get to it," he says. "No reason to wait." He knows if he gives himself time to think things over, he may not be able to do what must be done. (Years later, when his daughter asks him the difference between a hero and a coward, his answer will be, "About ten seconds thinking things over.")

The men approach the bomb, and crouch around it. "Bender, keep us lit with the flashlight," Cassino says. "Lieutenant Brown, remove the plug from the fuse orifice. If that

doesn't set the bomb off, we'll have to remove the fuse contact plate. Then we can look for the control box."

"How can you find it?" Gray asks.

"I'll just look into the bomb's guts. With any luck I'll see the control box. It's a white rectangle, about four inches on a side."

"What if you can't see it?"

Cassino shrugs. "That means it's not where the NEST message says it should be. We may have to push a probe into the bomb to move some wiring out of the way."

"Every time you touch anything, you could set the bomb off," Brown says.

"That's true," Cassino agrees.

Brown has positioned himself in front of the B43. Now he gently grasps the plug he'd inserted earlier in the fuse orifice, and begins to slowly turn it. Using only the slightest pressure necessary, he rotates the plug until it becomes loose in his hands. Finally, he pulls it away from the bomb and hands it to Gray, who rises and returns it to the equipment cart.

Cassino walks to the front of the bomb, falls to his knees, and peers into the open fuse orifice. With a sigh he stands. He turns to Gray. "We need to remove the fuse contact plate. Once we do, we'll be able to look inside the bomb. The NEST recommends placing a wad of cloth into the orifice, big enough to fill it. Then we should be able to rotate the plate, loosen it, and push it to the side."

Gray and Brown look around the area. Brown finds some unused grease rags, and brings them to Cassino. The munitions chief stuffs them into the bomb's open nose, and strains to rotate them with his fingers. "It's tough going, but it feels like I'm getting motion," he reports.

Gasping with effort, Cassino continues to rotate the rag-stuffed plate. After a few minutes, it moves loosely in his hand.

"Get me a probe," he says.

A long, slim, screwdriver-like metal shaft is brought to him. Once more, Cassino crouches before the bomb. First, he removes the rags he's been using to gain traction. Then, he raises the probe to eye level, and gently begins pushing the fuse plate further into the bomb's interior. When he has moved it inward about an inch, he slides the probe past it and pushes the plate to the side. Some of the bomb's interior is now visible. He begins using the probe to push aside wires within its interior.

His slow, careful search goes on for minutes. When Cassino rises again, he smiles. "Located the control box," he says. Turning to Gray, he asks for a pair of insulated gloves. When they are brought to him, Cassino puts them on.

"We need a high voltage power source," he says. "There's got to be one nearby."

Gray and Bender quickly find the mechanics who had been servicing the alert planes. Since the beginning of the incident, they have sequestered themselves in a maintenance shed behind the revetment, immediately outside the security zone.

When the men return, they rummage through the back of the semi-hangar. "Found it," Gray says. He unspools a bright yellow cable and brings it to Cassino.

"They use this for welding," he says, handing the cable to the munitions chief. "It ought to be sufficient."

"We'll see," Cassino says. "Is it live?"

"There's a switch about ten feet back," Gray says. "Once I activate it, there'll be current."

"Good," says Cassino. "OK, sergeant. Stand by the switch until I tell you to hit it. Somebody get me a knife."

Brown finds a knife on the equipment cart and hands it to him. Cassino immediately begins stripping the plastic insulation covering from the cable. "All I want is a single wire," he tells Brown, who remains nearby. "Just enough to tap that control box."

His work completed, Cassino holds the bare wire in front of him as he walks to the bomb. He kneels and carefully pushes it into the fuse orifice, pulling and pushing the wire slowly and carefully through its interior. After a minute he stops. "The wire is touching the control box," he says to Gray. "When I tell you, switch the current on. If anybody's religious, this is a good time for a prayer."

No one speaks. Cassino reaches into his pocket and touches the Saint Christopher's medal he has carried since World War II. "OK," he says quietly. "Sergeant Gray, switch the current on."

For a second, there is only silence. No one moves. Then Cassino slides away from the bomb, and pulls the cable with him. He stands. "Turn off the current, Sergeant Gray," he says. "The control box has been destroyed. The bomb seems to be safe."

The four men look at each other. No one yells or cries, but a vast release of tension surges through them. They have beaten the odds in a gigantic gamble set in motion by a foolish pilot. They have won. Aviano still exists. They are still alive.

Chapter 25: Putting a Monster to Bed

The ringing phone startles Colonel Lisle as he sits in his office. It is late: just after twenty-three thirty hours military time—half past eleven o'clock in the evening. He has determined to stay on call until he receives word from Cassino, or until the event they all fear takes place. Cautiously, he picks up the phone. "Colonel Lisle," he says.

"Sir, it's Colonel Cassino. Finally, some good news."

"The incident is resolved?"

"We think so. We've followed all of the instructions the experts on the plane gave us. As far as we can tell, the situation is secure. Of course, we won't know for sure until they arrive."

"That's great news," Lisle says with real emotion. "Great news!"

"Yes sir," Cassino continues. "The people from New Mexico won't get in until oh-five hundred. Once they've signed off on the situation, we should have everything cleaned up quickly. We have a problem, though."

"A problem? What's that?"

"We need mattresses, and lots of them."

"Call Colonel Randall. He runs supply."

"That's the problem, sir. I can't find Colonel Randall, or his assistant. In fact, I'm having trouble finding any officers. It's like everybody's gone."

Lisle looks at his phone. A sudden suspicion occurs to him. "Dan, just wait a few minutes," he says. "I promise you, you'll have all the mattresses you need." He hangs up the phone and walks down the hall to the desk where the officer of the day sits, reading a book.

"Lieutenant Packard," he says gently, so as not to startle the young officer, "lieutenant, I have an assignment for you."

"Yes sir!" the young man says, standing from his chair.

"Lieutenant, listen to me carefully. I need you to get a supply sergeant out of bed—somebody with keys to the storage buildings. Tell him I need two trucks, loaded with mattresses, on the flight line, ASAP. If he argues, tell him these are my orders. Do you understand?"

"Yes sir," the lieutenant says. "Two trucks, mattresses, flight line, your orders. What's the reason, sir, just in case somebody asks?"

"The reason, Lieutenant Packard, is that we are putting a monster to bed. Is that clear?" He turns to leave. "Now, get to it," he says over his shoulder.

Airman Bender jockeys the "Jammer" lift truck beneath the recently deadened B43.

"Shall we go ahead and detach it from the aircraft?" Brown asks Cassino.

"Not yet," the munitions chief replies. "let's wait for the mattresses to get here. I want this bomb to keep sleeping."

"What's your plan?"

"We'll line the bed of the Jammer with mattresses. The bomb will hardly drop at all when it's released from the F4. Once Bender gets the bomb unloaded and away from the aircraft, we'll pile even more mattresses on top of it," Cassino explains. "We'll keep them attached with tie-down straps. The NEST will want to take it back to Sandia, I think. DASA will probably detonate it underground in Nevada."

"It won't fit in a small plane," Gray says.

"Oh, no," Cassino agrees. "They're coming in a C-135. Plenty of room on board for the NEST and the bomb."

Now the sound of approaching trucks can be heard in the distance. “Here come our mattresses,” Brown says.

When they arrive, the mattresses are quickly unloaded from the trucks and carried into the secure area. They’re laid on the bed of the Jammer two deep, to further cushion the bomb as it’s released from the Phantom II. The bomb may be dead, but it’s still deadly. No one around it wants to take any chances with it that aren’t absolutely necessary.

Once the bomb rests on its cushion of mattresses in the Jammer’s bed, Bender slowly backs the vehicle away from the plane and stops. More mattresses are laid on top of the bomb, until it is covered by several layers of them. All are secured with tie-down straps. Bender then moves the Jammer to the edge of the revetment.

“That should do it, till the C-135 shows up,” Cassino says to his team. “We’re all done here. I’m putting each of you in for a commendation. I have never worked with a finer group of men. Thank you.”

Brown turns to his chief and shakes his hand. “You saved a lot of lives tonight, sir” he says, “including mine.”

Cassino grins. “That was as scared as I’ve ever been,” he says, shaking his head. “I’m going to remember what happened here for the rest of my life. It’s after midnight. You and Sergeant Gray go home to your families. Airman Bender and I will get some cots set up and babysit the B43 until the NEST shows up. They should be here before six.”

“Thank you, Colonel, I’ll be glad to see my wife again,” Brown says. “You know, I never realized until now how dangerous these beasts really are. I think we all take them for granted.”

“That pilot sure did,” Gray says.

Cassino nods. “He’s going to have a long time to think about what he did.”

Morning has come too soon. Reiss has slept fitfully. The hotel room's bed isn't large enough for two people in the midst of an argument. His mind keeps returning to the warning he got from Colonel Lisle last night. "If I find out word has gotten out and that you're responsible, you will be in serious trouble," he said. Still, how could Lisle find out? It was the weekend, hardly unusual for people to get away from the base. He rises from the bed. Best pack up the family and get back to Aviano, he decides. It's far too chilly for a day at the beach in any case.

Marge looks up, awakened. "Harry, what are you up to?" she asks.

"Packing us up," Reiss answers. "I didn't hear any bomb go off. We might as well go home."

His wife chuckles, nodding her head. "Yes," she agrees, "the world didn't end, did it? Here we are, a hundred miles from our house. Don't bother to pack yet. It's too early and I'm still tired."

She lays her head back on her pillow. "Besides, Olive and I are going shopping, as long as we're here. Lydia's coming too. Did you want to join us?"

Reiss's expression is answer enough. "I didn't think so," Marge sighs. "Well, I'm sure you can find something to do with your friends. I guess most of them are here too."

She turns her face from him and shuts her eyes. "Go on out if you want," she mumbles. "But keep it quiet. I don't want to get up for at least another hour."

Reiss shaves, brushes his teeth, and dresses himself, careful to mind the noise he makes. He leaves the room, making his way to the hotel lobby—which he finds empty. Not much reason to rush around yet on an Italian Sunday, he thinks to himself. Soon, the women and children of

Lignano will go to Mass at the church up the street, he's certain. The men of the town will gather at the hotel's trattoria for coffee and strega. He intends to join them.

They awaken Randy at 0500. He's given his shaving kit, and told to shower and shave. Clean clothes—his dress blue uniform—have been brought to the room where he's been detained. He asks questions which are ignored by the people around him. He assumes he's going somewhere, but can't guess his destination. He cleans himself up and dons his uniform. Two Air Policemen escort him from his room, down the hall to an office at the front of the building. There he is met by a captain.

"We're taking you to the flight line," he's told. "There you will be turned over to a representative from DASA."

"What's DASA?" Randy asks, frowning.

"Defense Atomic Support Agency," the captain says. "He'll take over your custody from here on out."

"I want to speak to my father," Randy says, as firmly as he's able.

The captain smiles. "I'm sure something can be arranged," he says, "once you're in the states."

"The states?" Now Randy is totally bewildered.

"That's right," the captain tells him. "You're getting on a jet right now. Your next stop will be Kirtland Air Force Base, New Mexico, U.S.A."

Randy starts to speak.

"No more questions, lieutenant," the captain says, pushing him forward. "You have a plane to catch." He leads Randy from the building to a waiting truck.

Dieter Klempf and his NEST touch down at Aviano before 0600. There's plenty to do. He and Norcross carefully unload the diagnostic equipment and associated gear the team has brought with them. Then, the four men walk quickly to the incident site and process through the security perimeter. Once inside, they're met by a haggard Air Force lieutenant colonel, his dark blue work uniform still stiff with perspiration. "I'm Dan Cassino," the man says, introducing himself. "I run munitions here at Aviano. I'm very glad to see you guys."

Klempf shakes the man's hand. "You and your team did some extraordinary work last night," he tells him.

Cassino shakes his head. "We only did what you told us," he says. "We couldn't afford to wait for you. Just the landing of your plane could have set the bomb off."

"Let's see how dead this beast really is," Klempf says. "Norcross, bring me the circuit diagnostic," he calls as he walks toward the mattress-swathed bomb.

His assistant brings out a device about the size and shape of a hi-fi tuner. A wire ending in a small plug hangs from it. He hands the device to Klempf and walks to the side of the bomb, where he locates a small aperture. He plugs the wire from the device into the bomb.

The NEST leader watches as the bank of lights on the device blink from white to red to green. Most remain flashing red. "You have been successful," Klempf announces, smiling. "The arming circuits are dead. This device will not go off without significant repair."

The NEST engineers swarm over the B43, testing various circuits and emptying internal reservoirs with equipment they've carried from Sandia. They make very sure the bomb has no way of creating damage, and that no further damage can occur to the bomb.

After an hour, when they've finished, Airman Bender pilots the mattress-stuffed jammer across the flight line to the C-135, where the plane's cargo master loads it into the aircraft's hold and securely straps it down, upholstery and all.

There's time remaining for a light breakfast and a cup of coffee at the flight line canteen before the team's scheduled take-off. They've just returned to the side of their plane and met with the pilot when an Air Police truck arrives beside them.

"Which one of you is Klempf?" an Air Police captain asks as he steps from the truck. Klempf gestures in answer.

"Sir, I've got some paperwork for you to sign here," the captain says, handing Klempf a clipboard and a pen. "It transfers custody of Lieutenant Simms to you," he continues, nodding in the direction of the truck behind him.

Klempf takes the clipboard and scans the paperwork, then signs and hands it back. The captain gestures, and Randy is brought forth. "Seat him in the plane," the NEST leader tells the escorting AP sergeant.

Klempf watches Randy closely as the young pilot is led up the gangway into the C-135. He can't help staring at the man who has caused him and others so much anguish. "Will you need handcuffs or other restraints?" The AP captain asks. "I have some in the truck."

"No," Klempf says, shaking his head. "They shouldn't be necessary. He seems well-behaved, and he'll stay in the plane until we've reached Kirtland."

The AP comes out of the plane. "OK," the captain nods, "he's all yours. Have a good flight." The two men get back in their truck and drive away.

Klempf is about to enter the plane himself, when a light blue civilian car pulls up near the flight line. A man gets out and walks quickly toward him. He recognizes the figure as Cassino when he draws closer.

"Wanted to make sure I caught you before you left," Cassino says as he approaches. "The tower said you hadn't buttoned up yet."

He extends his hand, and Klempf shakes it. "Thank you for coming," the DASA tech says. "I didn't think I'd see you."

Cassino smiles. "I couldn't go home without seeing you off," he says, "and I want to see that B43 gone from Aviano."

"Thanks to your team, Colonel," Klempf says. He smiles as well. "If we meet again, I hope it will be in a bar or on a golf course." He turns and climbs into the plane.

As he reaches his seat, the pilot secures the C-135's door. "Are we cleared for takeoff?" he asks the pilot.

"Yes sir," the pilot tells him. "We'll stop to refuel at Rota, Spain, and Dover. Then it's a clear shot to Kirtland."

"Make it happen," Klempf says as he settles into his seat and buckles his seatbelt. "It hasn't been long, but I've already had enough of Italy."

The pilot nods, and contacts Aviano tower for taxi and runway instructions. Engines start. Airmen remove the chocks from the plane's wheels. Soon, the plane begins to move.

A few minutes after the NEST plane has taken off, the Phantom II where the incident unfolded is towed from its revetment to a maintenance hangar. The plane will need a thorough inspection. An hour later, another Phantom is towed to take its place. Bender and a loading party, supervised by Brown, clamp another B43 in place beneath the new alert aircraft.

At 1600 hours—four o'clock, Sunday afternoon—alert crews report to the Phantoms in their revetments, just as they have in the past. Normal operations resume at Aviano Air Base. It is as though yesterday's NAICAP never occurred.

Chapter 26: A Cocktail to Remember

Several months later, as the sun lowers on a summer day in Aviano, Cassino stops by the base officer's club for a cocktail and some dinner. His family is back in the states. He sent them home after the incident, so they could take advantage of the chance to travel by cruise ship. He stays on alone at Aviano for the rest of his tour, with a little less than a year remaining.

He goes to the club's bar, pays his respects to the bartender, and orders his customary Manhattan cocktail. As Cassino sits by himself, musing over the day's events, a man he has never seen before walks into the bar and sits beside him. The stranger orders a Martini and looks intently at him. "Colonel Cassino?" he asks.

"That's me," Cassino says, turning to face him.

"I've wanted to meet you for some time," the man continues. "In fact, I came up here today hoping to find you. I'd like to shake your hand."

Cassino shakes the man's offered hand, though he's puzzled by the offer. "Tell me what I've done to deserve this," he asks. "I don't think I caught your name."

The man smiles. "I didn't throw it," he replies. "You can call me John. John Smith. I work for another part of our government over here. You have done us all a great service. I wanted to thank you personally."

Cassino looks closely at the man who calls himself Smith. The stranger wears a well-cut grey suit, a white shirt, and a black knit tie. "I can't imagine what I could have done," he says, sipping his drink.

"How about saving NATO?" Smith asks. "That incident last year, that bomb you fixed—if you had failed, if it had gone off, think about what would have happened."

Cassino frowns, and looks around the half-filled bar. “We’re not in a good place to talk about that,” he cautions.

“I agree,” Smith says. “I looked at the menu here, and they’re offering steak. If you’ll join me for dinner, I’ll buy one for both of us. Believe me, it’s the least I can do. While we’re eating, we can talk a little more.”

Intrigued, Cassino accepts the stranger’s offer. The men settle their bar bills and walk to a table in the corner of the adjoining dining room. They’re seated, and menus are brought around. Both order another cocktail.

As he sips his Manhattan, Cassino thanks Smith for the drink and the dinner. “I’ve got to apologize,” he explains. “You know I can’t talk about the event you brought up.”

“No need,” Smith says, smiling. “I’ve already read the reports. Dry reading, but very thorough. No, I’m here to tell you about the impact you and your team have had on Europe. That is, if you’ll indulge me.”

Cassino gives a puzzled nod.

“I don’t know how much attention you pay to Italian politics, Dan,” Smith begins. “This country’s governments have all balanced at the tip of collapse since the war. Aldo Moro heads the current leadership, and he’s in pretty good shape—compared to some of the regimes before his. Still, an event like the one that could have happened here would have swept him from power.”

“What would that mean?”

“The best bet for a replacement would have been the Communist—Palmiro Togliatti. We believe he would have allied with the socialists under Pietro Nenni to take over. It would have been a chaotic time if you hadn’t been successful. There would have been massive protests, riots

from Milan to Naples. We estimate that six thousand people might have died, you know, and ten thousand more could have been injured or blinded. It would have been the greatest humanitarian disaster Europe has seen since World War II. Italy's medical resources could not have handled it. There aren't enough beds or doctors in the whole nation. Besides that, Aviano is relatively isolated, rural, hard to get to. It would have been a terrible disaster."

"We would have helped."

"Sure we would—if they let us. Our analysts project that a Togliatti regime would have called for the immediate removal of all nuclear weapons from Italy, and that's just for starts. He'd have demanded inspections and oversight over all U.S. military here. He would probably have kicked the U.S. out of Italy entirely. We believe he would have taken Italy out of NATO. Our whole southern flank would have dissolved."

"Would Italy have fallen under Soviet influence?"

"We don't think so, Dan. Italian communism is a far cry from what the commissars practice in Moscow. On the other hand, they don't care much for us either. Palmiro's Italy wouldn't look deep red. Bright pink, perhaps."

By now the steaks have arrived, and conversation is arrested by the attention both men pay their dinners. Afterward, as the plates are cleared from the table, Smith looks at his watch. "Dan, I've got to go," he announces. "I have to be in Venice in a few hours. I shouldn't have taken the detour, but I had to meet the man who maybe saved NATO."

Cassino shakes his head as he stands from the table. "There were a lot of other people involved," he says. "They all deserve as much credit as I do."

"That's a matter of opinion," Smith says, shaking Cassino's hand one last time. Leaving a tip on the table, he hurries from the club. Cassino will never see him again.

Chapter 27: Aftermath

Events leave shadows and echoes, loose ends to be tied up in proportion to their magnitude. The NAICAP at Aviano Air Base in November 1965, was a significant event. It cast a long shadow. Some of its echoes would not fade for decades.

The Bomb

The B43 activated at Aviano Air Base was flown to Kirtland Air Force Base, arriving there within twenty-four hours. It was immediately conveyed to a secure bunker, where it was methodically examined by Sandia and DASA nuclear ordnance experts. Special attention was paid to the operation of its PAL device. Dieter Klempf personally took part in the examinations.

With refurbished electronics, the bomb was transported to Nevada. There, in 1966, it became one of thirty-eight devices detonated underground, part of the Latchkey series of nuclear tests. Records indicate its yield to have equaled seven hundred forty-two kilotons of TNT.

A total of two thousand B43 thermonuclear gravity bombs were fabricated. Production had already ended in 1961, several years before the Aviano incident took place. The bombs were replaced by the improved B61 over time. The last B43 was removed from U.S. Air Force inventory in 1991.

The Pilot

Upon his arrival at Kirtland Air Force Base, First Lieutenant Randall Simms III was immediately arrested and confined. He was notified of the charges against him, informed of his upcoming general court martial, and assigned a defense attorney from Kirtland's JAG (Judge Advocate General) office. Captain Cameron Paraday, the JAG lawyer delegated to represent him, met with Randy the day after his incarceration.

To his amazement, the young lieutenant refused to discuss his case. “Just let me talk to my father,” he said to Paraday. “He will work all of this out.”

“Lieutenant, do you realize how serious these charges are?” Paraday asked. “If you’re found guilty of all of them, you could spend the rest of your life in a federal prison. You and I have to work out a defense. Let’s start by going over what happened, as best you remember.”

“Don’t you see?” Randy said, pushing the files on the table aside, “none of this matters. My dad can make it all go away. He is a very powerful man.”

Paraday shook his head. “Your father can’t help you. Not this time. Still, you have the right to speak to him. Maybe he can get through to you. I’ll set up the call for later today.”

Randy was finally able to speak to his father that same afternoon. As he had expected, it didn’t go well. Randall Simms II called his son a fool and much worse. He harangued Randy for stupidity, and for putting the lives of others at risk. “In my day, we shot assholes like you,” his father told him.

Still, once the invective subsided, the elder Simms promised to help his son out of his trouble. “This will be the last time, by God,” he growled. He got the names of all the people involved from his now openly weeping offspring—everyone from Cassino to Dieter Klempf.

“They haven’t treated me very well,” Randy blubbered. “I’ve really been scared. All I want to do is get this behind me. I want to get out of the Air Force, dad. Then I can come home and sell cars for you, just like we planned.”

“Give me some time, son,” his father said. “We’ll take care of this.”

After he hung up the phone, Randy felt as though a great weight had been lifted from his shoulders. That night, he enjoyed the first sound sleep he’d had since Saturday.

Nothing more happened for several days. Randy rose for reveille every morning, waiting for some sign of change to his situation. None came. Then, a week later, a letter was handed to him. It had been sent by his father.

Frowning, he opened the envelope, wondering why the old man hadn't called instead. The letter was certainly from dad. It was even on his "Rockin' Randall" letterhead. The handwriting was the same scrawl his father used. The words could not be true.

"Son," the letter read, "I have twisted every arm I know and called in every favor. I've talked to senators and congressmen, and even the Secretary of the Air Force. There is no way to make these charges against you go away. They are too serious. This has broken your mother's heart."

Randy sat on his bunk, unable to read on. His eyes filled with tears. It was as though a yawning pit had opened beneath him. With great effort, he composed himself to finish the letter.

"Unless the court martial board finds you innocent, you are going to prison," the letter went on. "I may be able to get your sentence reduced. That will be the best I can do. If I could go in your place, I would. You are my only son, my hope for the future. Your failure is mine. Perhaps if I had raised you differently, this would never have happened. Stand up and take the punishment they give you like a man. Don't do anything to further dishonor yourself or your name. Your mother and I will be waiting for you until you come home. Then you can have peace. Remember how much we love you. I will come see you as soon as I can."

A long, keening moan issued from Randy's throat. He wept for over an hour. Then, enraged, he ripped his father's letter to pieces and flushed it down the toilet. He fell on his bunk, curled into a fetal position, and slept for eighteen hours. When he awoke the next day, he contacted Captain Paraday to set up a meeting.

Paraday was amazed at the change he saw in the young lieutenant. Defiance had deserted him, replaced by sullen acceptance of his circumstances. Through the conferences that followed, he was able to build the structure of a defense, but it was weak. It depended almost entirely on supporting testimony from Randy's squadron-mates. They had to agree that they did not fully understand the significance of the PAL device, and that they had spun its dial themselves while on alert duty without concern.

Randy wanted to go further. "They're blowing this all out of proportion," he fumed. "Fucking lifers! OK, OK, I spun the dial. I admit that. I hit the numbers. Could have happened to anybody! Anybody! I turned the fucking bomb on. So what? All they had to do was turn the damn thing off. How hard can that be?"

Paraday tried to reason with his client. He explained that an activated thermonuclear bomb was not easy to turn off. He knew that the prosecution could and would call witnesses who would prove how close the incident had come to destroying the base. Randy would not be persuaded. "Wait till I get on that stand," he said more than once.

The trial, when it came, went as expected. Testimony from those at the scene, Cassino and Klempf, established the severity of the incident—how close to a nuclear detonation the situation had been. Randy's squadron mates, including his squadron leader, all admitted spinning the PAL dial while on alert duty. Even so, Major Tanner and the others agreed that they had been extensively briefed on what the device did and the possible consequences of such activities. All admitted they had known what they did was wrong.

Randy was questioned closely by the officers on the court martial board. At first, he professed remorse for the situation he had caused. The questions continued. After an hour on the

stand, his self-control evaporated. “Everyone is making too much of this,” he said to the panel. “Everybody spun that dial. They’ve all told you that. I am being made a scapegoat. It’s not fair.”

When gently asked to explain further, Randy was happy to oblige—despite the frantic gestures of his counsel. “Nobody got hurt,” he said, looking around the room. “Nobody! All they had to do was turn the bomb off. That’s all. They had it done in a few hours.”

He was asked about the bomb itself, the destruction of government property. “I’ll pay the fine,” Randy said defiantly. “What could it be, a million bucks? My family has plenty of money. I know you’re going to kick me out of the Air Force. Be my guest. Go right ahead!”

As they sat in the hall outside the courtroom awaiting deliberations, Paraday spoke his mind. “I’ve never had a worse client,” he told Randy, “and I’ve had some bad ones. We had a pretty good case for mitigation until you opened your mouth.”

Randy laughed. “I’ve been wanting to say those things since I got here,” he said. “It’s about time somebody spoke up to these lifers. My dad’s going to fix this. You’ll see,” he continued. “He told me he would get my sentence reduced. If I spend a month more in confinement, I’ll be amazed.”

Astonished, the JAG lawyer stared at his client. “Has your old man always fixed things for you, Randy?” he asked.

“He’s always helped me through serious trouble,” Randy agreed. “You wait. You’re going to be surprised.”

“I think one of us will be very surprised,” Paraday said. The men sat in silence after that, awaiting the court’s decision.

They didn’t have long to wait. The court martial board reconvened after less than three hours deliberation. Paraday stood by Randy as the young airman was found guilty on all counts:

gross negligence, endangering the lives of others, destruction of government property, failure to obey lawful orders, and misuse of government property as well.

"The court was moved to leniency in your case," the presiding judge told him, "due your age, inexperience, and the general attitude of those in your squadron. These factors were outweighed, however, by the total lack of contrition and blatantly arrogant behavior you have displayed here."

The punishment meted out to him was harsh. Randy was stripped of all rank and sentenced to the U.S. Disciplinary Barracks at Fort Leavenworth, Kansas for twenty years. At the completion of his sentence, he would receive a dishonorable discharge from the Air Force.

Though he remained standing at attention, Randy's face turned ashen when he heard his sentence read. As he was led away to a holding cell, his hands began to visibly shake. Wild-eyed, he looked toward his attorney, who walked with him as he was led from the courtroom. "I'll speak to you soon," Paraday told him.

Later that day, Randy and his lawyer met in a small room near his cell. "There's grounds for an appeal here, Randy," Paraday said as he looked across the table at his client, who now sat shackled. An indefinable spark had vanished from the young pilot. He seemed dazed and puzzled by what was happening to him.

"I just want to talk to my father," Randy said.

"You're allowed a call in here," Paraday said, discouraged by Randy's attitude. Even now, facing two decades of imprisonment, he still looked to his father to somehow change his situation. "I'll set it up when I leave," he promised. With that, he left Randy to the guards. There was nothing to be done for a man who would not face reality, he decided. He made up his mind to work on the appeal anyhow. Paraday was a good military lawyer. He honestly believed his

client's sentence had been overly severe. Ultimately, his attempts were unsuccessful. Randy's outburst had been destructive. The appeals were denied.

Two weeks later, on a frosty February morning in Kansas, Randy first saw the disciplinary barracks at Fort Leavenworth. They rose before him as he and four other new prisoners were driven through the sprawling army base, shackled in a bus that had picked him up from a nearby military airport. It was apparent how the place got its nickname, "The Castle." The yellow stone structure reared from the Kansas plain like a medieval fortress.

Randy would abide here until he reached middle age. The thought numbed him. His keepers explained his new life: he would start out in maximum security, locked in his cell twenty-three hours a day—shackled and escorted by guards for fresh air or showers. His meals would be slid through a narrow slot in his cell door. Good behavior would get him moved into the general barracks population, where he'd have more freedom. He was stripped, body cavity searched for weapons and drugs, issued his heavily starched brown fatigues, and marched to his new home. They locked him in his six-by-nine-foot cell and left.

For a few minutes Randy sat on his bunk, trying to comprehend what had happened to him. The small cell was bleak and monochromatic. There was no window to the outside world, only a meshed viewport in the door to the hall beyond. The cell was silent. The walls, the air itself seemed to press on the young airman. He gasped for breath. His heart raced. Twenty years! He fell back on the bed and immediately passed into deep unconsciousness.

After that, he found himself blunted and dulled by constant grinding monotony of prison life. Even when his situation changed, the result was transparent. After a few weeks, he was transferred from maximum security. After several more, he was eased into the general prison

population. There were other men aroud him now, but he hardly noticed them. He did not want to know them. He did not want to give in, to make himself part of this awful place.

He was given work to do, as was everybody else. Only the sick or injured stayed in their bunks. His typical assignments were collecting laundry, cleaning areas with mop and broom, helping the kitchen staff—stoop labor. His pay for this work was pennies an hour. He was offered the chance to apply for a variety of vocational programs: carpentry, dental technician training, graphic design, screen printing, and welding. He dabbled in graphic design, but soon dropped out. Higher paying work details were available: embroidery, textile repair, woodworking, and even the highly coveted barber training. These assignments could earn an inmate fourteen to eighty cents an hour. Randy spurned them all.

Educational programs were available as well. Randy could have gained another college degree, had he chosen to do so. He did not. He could have enrolled in one of Leavenworth's dozen or more self-growth focused treatment programs. He ignored them.

For the first few years, Randy spent a lot of his spare time in the gym. Even though he'd been a fair athlete in high school and college, he didn't participate in any team sports. Solitary exercise, weightlifting, and aerobics were his pastime. Sometimes he ran for an hour or more on the indoor track.

He watched a lot of TV and movies, sitting far to the rear on the left of the seating area. Front and center seating was reserved for more esteemed inmates. He used the library extensively as well, preferring John D. McDonald and other mystery authors. He seldom spoke to anyone except out of necessity, and neither wrote nor received any mail.

Near the end of his first year in Leavenworth, Randy's parents came to see him. They came away shocked by his appearance. He had always been a gregarious, friendly young man,

casual and happy. The man across the table from them now had none of these traits. His hair was cut very short, and appeared to be thinning. His eyes avoided theirs, and seemed dull and blank. He was pale and clearly uncomfortable, as if under tension. A smile never crossed his face. There was no real conversation. He merely responded to their questions.

His mother filled in the blanks with a shrill, spirited monologue about what was going on in and around the Simms family: cousins in college or just married, uncles and aunts who had visited, a trip she and his father had recently taken. From time to time, Randy nodded his head in response. He seldom looked up. It was as though the neon lights above hurt his eyes.

Randy's father ended his wife's cheerfully brittle monolog with a look and a squeeze of her hand. She began to weep softly, holding a tissue to her eyes. He turned to his son, his eyes steely. "Look at me," he said. "Look at me, goddammit."

Randy forced himself to look up. His father stared intently into his eyes.

"You've had a bad break," the elder Simms growled. "OK, so has everybody else in this joint. You're alive! You could have been dead. Most of these guys have no future. None at all. You're Randy Simms, goddammit! When you get out, you'll have everything I own."

Randy could only nod. Again, he lowered his eyes.

"OK, I've said my piece," his father said, more gently. "Are you OK? Are they treating you OK?"

Randy only nodded, although he wanted to scream. He wanted to yell, "Get me out of here, dad!" at the top of his lungs.

"Is there anything you need?" his father continued.

"Money," Randy mumbled. "Send me money."

"How much, son? How much do you need?"

Randy thought the question over. Inmate spending was limited to eighty dollars a month at the prison canteen. That would buy him all the cigarettes and snacks he needed. More? More could be used for loans to others, to collect favors he could use to his advantage. During his short stay at Leavenworth, he had already learned the bitter price charged for accepting favors from others. Like the bible said, "Better to give than to receive." He grimaced at the thought.

"Send me two hundred a month," he finally answered. No reason to be greedy.

"I'll mail it to you," his dad said. Randy knew he would.

"Anything else, son?"

"Come see me again, dad," Randy said, emotion in his voice for the first time. Suddenly, he did not want his parents to leave. Nevertheless, the bell was sounding. Others were waiting to use the table.

Randy's father gathered his wife in his arms and stood, a look of terrible anguish on his face. A guard walked over to lead his son away. "We love you, son," he said with deep emotion. His son looked back as he was led out of the visitor's center. For a split second, he looked like the young man he had once been. Then he turned a corner, and was gone.

After that, Randy saw his father once a year—on or close to his birthday. He never saw his mother again. She died two years later, of heart disease he was told.

Randy gradually lost interest in using the gym—preferring the library or TV instead. He began to gain weight, since he had plenty of money to spend on snacks from the canteen. By the time he'd served five years in Leavenworth, he'd gained more than forty pounds.

The Leavenworth staff noticed Randy's deterioration. Even though rehabilitation was not a primary goal, emotionally disturbed inmates were a dangerous element. Randy's simmering rage and alienation could one day erupt and cause a serious problem.

To correct his deepening mental illness, Randy was examined and counseled. He was prescribed pills, and—when those pills didn't work—stronger pills were meted out. Randy became less angry, less volatile. He liked the pills. The stronger they got, the better he liked them. His keepers were sanguine. They had defused a potential problem. That was enough.

During Randy's seventh year in Leavenworth, his father died. The family was stunned. Randall Simms II had only been fifty-five. His massive stroke occurred during the night, while he slept. He went to bed as usual, and was found dead the next day—by a secretary concerned because he had not shown up for work.

Beyond his car sales showmanship, Randy's father had been a methodical, careful man. As his businesses started to grow and make substantial money, he found a banker he could depend upon and set up a trust. The trust now held substantial assets, and became the mechanism Randall II planned to insure his family's wealth after his demise. His lawyers assured him it was bullet-proof. No greedy relative would be able to crack it in court.

Even before Randy's terrible mistake, it had never been his father's plan to make him executor and manager of the trust, should he pass on. Randy was too young. He needed leavening. The job would pass instead to Patrick, Randall II's younger brother. Patrick was five years his junior, and had degrees in finance and accounting. He had managed the books for the Simms family businesses for more than a decade.

Even though he was younger than his brother, Patrick had the appearance of an older man. Some who knew him said he had never acted young. Tall, thin, pale, and balding, Patrick neither drank nor smoked. He was an elder at the Presbyterian church where he and his family worshiped every week. His only known passion—besides the family finances—was golf. He had an honest seven handicap and rarely missed a putt under ten feet.

Once the funeral was over and family business had been put in order, Patrick reluctantly travelled to Leavenworth to visit Randy. Sitting in the visitors' center, he didn't recognize his nephew when the guards brought him out. His memory was of a slim young man, prone to smile and laugh. The man put before him had none of those attributes. This man was fat, and well on his way to obesity. His pale, puffy face held hooded eyes and a dull, humorless expression. As he sat down, he regarded his uncle as he might have looked at a bug on his cell's floor. "Where's my father?" the altered Randy said.

Patrick sat straighter in his chair. "Randy," he said, "I am sorry to be the one to have to tell you this. Your father …"

"He's dead, isn't he?" Randy interrupted. He showed no emotion. His eyes continued to track his uncle relentlessly. "I knew it when the checks stopped coming."

His uncle sighed. This was going to be difficult. "Yes, Randy, I'm sorry to say he's passed away. In his sleep, about two months ago. It was peaceful, the doctors tell me. He probably felt very little pain."

Randy's hands balled into fists. His eyes squeezed shut. "Shit!" he muttered. "Shit, shit, shit." A single tear rolled down his cheek. He wiped it away and resumed his previous emotionless stare, as though nothing had happened.

"Randy, are you OK?" Patrick asked.

"Yeah, I'm alright," Randy said. He shook his head, as if to clear cobwebs from his mind. He smiled: a tight, mirthless grin. "So, Uncle Pat. I'll bet you've got some papers for me to sign, don't you?"

"I did bring some paperwork, yes." Patrick admitted. "When your father wrote his will, no one could know of you … your current …"

Randy laughed. “Go ahead, say it!” He spat. “You’re talking about my sentence to a federal prison. Well, here’s the deal, Uncle Pat. I’m not going to sign anything. Not one piece of paper. Not till I get out of this tomb and get a lawyer of my own, to help me understand what you’re shoving under my nose. You might as well take that crap and stick it back in your briefcase. Or,” he finished, “you can shove it right up your ass.”

Patrick reddened. “Don’t talk that way to me,” he said. “You’re the one who has shamed your whole family. I’m here to help you, and you’re too dumb to recognize it. OK, have it your way.” Sweeping the paperwork he had brought off the table, he stuffed it back into his briefcase. The two men glowered at each other.

After a long, uncomfortable silence, Randy finally spoke. “OK,” he said, “I’m sorry. This place makes me crazy. Tell me what it is you want me to sign.”

His uncle paused, then pulled some of the papers out of his briefcase. “Just a few matters that have to be taken care of,” he said. “This first one’s a power of attorney …”

“No,” Randy interrupted. “I won’t sign that.”

“Be reasonable. There are decisions that have to be made from time to time—investment decisions, money transfers—we’re talking about your money here, Randy. You can’t expect me to run out here every time something needs to be authorized.”

“Yeah, I do,” Randy said. “Sorry if that’s a pain in the butt for you. I don’t enjoy being here either. I guess we’ll both have to put up with the inconvenience.” He smiled.

“What can I do to make you see reason?” pleaded an exasperated Patrick.

“Start sending the money again,” Randy said. “After I see some checks come in, maybe I’ll trust you more, Uncle Pat.”

The checks began coming again a week after Patrick got back to New York.

Little changed in Randy's world during the three years that followed. He gained another ten pounds, and bought himself a new pair of shoes—cordovan Florsheim wing-tips, worth more than one hundred dollars. Leavenworth inmates were all required to wear the same starched brown uniform, but they were allowed to choose their own footwear. Expensive shoes were a badge of distinction. Randy's were always polished to a lustrous shine, attended to by those who owed him favors.

Suddenly, in 1976, Randy was released from Leavenworth. These were the dark days for the U.S. military. The end of the Vietnam War had brought with it a decline in morale, the loss of good junior and non-commissioned officers, an increase in crime and disobedience. Non-violent inmates who had served a substantial amount of their original sentences were considered for early release, to make room for new offenders. Randy had a clean record, and was high on the list. That June, surprised and elated, he sat in an airliner flying out of Kansas City to La Guardia Airport, where Uncle Pat would meet him. After more than ten years in military prison and the ignominy a dishonorable discharge, Randall Simms III was a free man again.

As his plane circled for its landing, Randy took stock of himself. He felt as though he had just awakened from a terrible nightmare. He was still tall, a little over six feet, but no longer the slim man he had been. At two hundred forty pounds, he hadn't been able to look down and see his feet for years. He knew he was no longer handsome, but he wasn't scarred or ugly either. A few months at the gym and he could be back in shape, he assured himself. His old clothes wouldn't fit him, of course. He would buy new. He could take a shower, all by himself. He could eat, and drink, and sleep whenever he wanted. Nobody could tell him what to do, not anymore. He vowed he would never let anybody confine him again. Ever.

Randy struggled to adjust to the life he had hoped for years to resume. The trust assured him income, but he wanted to work—to sell cars at one of his father's dealerships. It was a dream he had clung to during all the time he spent in the hell of prison. Now, he wanted to make it real.

Uncle Patrick got him a car sales job, at the Dodge dealership in Newburgh, just as Randy had envisioned. Sadly, his sales skills did not match his dreams. He tended to lose his temper when challenged. Prospective car buyers found him belligerent. One called him "creepy." He became angry and aggressive to the other salesmen, refusing to wait for his turn on the showroom floor, shouting vile epithets when challenged.

The dealership manager complained. Randy's behavior was affecting sales. Patrick was forced to act. Randy was transferred to "F&I," the finance and insurance department. Though many find the work there dull, it contributes a great deal to an auto dealership's bottom line, since it is where the financing arrangements, insurance, and service upgrades that surround every transaction are negotiated. A skilled F&I representative can add thousands to the value of a new car sale.

To everyone's surprise, Randy accepted his new position without argument. His aggression and belligerence largely ceased. He became quiescent, placid, and dreamy. Unfortunately, his sales skills remained unimproved. Eventually, he was moved to an administrative job without customer contact. He had an office to himself and relatively little to do, which suited Randy just fine. He had discovered a blurred, fuzzy escape from reality through alcohol.

Before Leavenworth, Randy hadn't paid much attention to liquor. At parties, he rarely had more than a couple of drinks or a few beers. All that changed when he returned from prison.

Released from constant regimentation, he became bored. He had no friends. His former acquaintances all shunned him. Like many bachelors, he ate out a lot. As the novelty of his new freedom waned, he found less reason to return to his small apartment for the solitary, luminous buzz of television. Instead, he began staying for drinks at restaurant bars. After a while, the drinks came first. It didn't take long before the food didn't matter much at all.

Randy's spiral from occasional drinker to alcoholic took less than two years. Early on, he limited his heaviest drinking to weekends, when his loneliness became most oppressive. After a few months, he easily slid into a nightly habit, but prided himself that he never touched a drop before the end of the workday. Soon, waiting until then became meaningless. A drink or two at lunch made the afternoon drift by more easily. A long morning swig became sensible—the hair of the dog. By the time he began wondering about his health, Randy had started keeping a fifth of vodka in his desk at work, just to help him get through the day. He chose vodka because he assured himself it had no discernible odor.

Members of his family later wondered if a woman in his life might have helped. Randy never seriously pursued that option once he came back from Leavenworth. At his core, he was too injured by his time in prison to ever open his heart and soul to another. His female companionship was limited to the working girls he met at the bars he frequented. A few took a run at him, coveting his family's wealth. Randy's gross personal habits and casual viciousness pushed even the most stubbornly avaricious away.

The early symptoms of his liver disease went largely unnoticed. Randy was used to his fatigue. He had been clinically depressed for years. He knew he was eating less so he took the weight loss, when it came, for granted. Losing weight was a good thing, he said to himself. The easy bruising and bleeding seemed to him to be nothing more than a family trait. Didn't Uncle

Pat have the same problem? Band-aids took care of it nicely. Even the jaundice escaped his notice until others brought it to his attention. It was the bouts of nausea that finally drove him to seek medical help. By then he had been a full-blown alcoholic for more than five years. His liver was irreparably scarred.

His uncle pleaded with him to enter a detox program. Randy's doctors had told him if his nephew didn't stop drinking, he'd be dead within a few years. Randy laughed. He felt dead inside right now. The liquor was the only thing that took away his pain. Besides, he refused to put himself in any kind of captivity again. He wasn't about to give up alcohol, and he didn't.

The day finally came when he didn't show up for work. More than a week went by without anyone seeing or hearing from Randy at all. Receiving the report, Patrick took it upon himself to check on the younger man. He convinced the building superintendent to unlock Randy's apartment. When he entered, the odor pervading the interior nearly drove him away. The place was a sty. Dirty clothes littered the floor of the living room, and the small kitchen crawled with filth and insects. Forcing himself to move on, he found Randy in his noisome bed, motionless, lying in his own excrement. He was unclothed, but still wore his once prized Florsheim wingtips—now scuffed and ruined like their owner. Patrick felt his nephew's neck for a pulse. Finding none, he pawed through the apartment's debris, found a phone, and called the police.

The local paper carried a tiny obituary. The funeral was very private, attended by a few family members. Randy was laid to rest in the Simms plot, beside his mother and father. At the age of forty-six, he had died from the effects of a bomb that never went off.

Harry Reiss

In reality, Harry Reiss's military career had been in decline for some time. He hadn't noticed. The fact that he was passed over for promotion in 1965 should have been a strong wake-up call. It wasn't. He convinced himself that he'd make light colonel the second time around, just like plenty of others. Instead, when he thought about it later on, Reiss placed the beginning of the end of his Air Force career at the meeting he had with Colonel Lisle—Aviano's base commander—on the Monday after the incident on the flight line. In his mind, none of what happened from then on was his fault.

That fateful Monday, the weekly meeting for all officers with command or staff responsibility proceeded as if nothing had happened over the weekend. In fact, Lisle had been ordered by his superiors in Ramstein to keep mention of the NAICAP to a minimum, and to actively suppress conversation about it. To that end, he spoke to those assembled as the staff meeting closed. "Some of you may have heard about an incident that took place on our flight line last Saturday," Lisle said. "Please pay close attention to me. I want no further conversation about that incident to take place on this base. Some aspects of what went on are highly classified. Discussions concerning the incident will be considered a breach of security. If any such discussions are reported to me, I will deal with them myself and I will deal with them harshly." He looked around the conference room at the officers who reported to him—all majors and lieutenant colonels, career airmen. While he knew talk about the incident would continue, Lisle felt he had stopped most of it. He dismissed his staff, ending the meeting. "Major Reiss," he called, as everyone moved to leave the conference room, "please come see me in my office."

After a few minutes and another cup of coffee, Reiss forced himself to walk down the hall of the headquarters building to the base commander's office. Although he couldn't be sure,

he thought he had an idea why he'd been called there. He straightened his shoulders, entered the room, and reported to Lisle, who sat at his desk. Lisle gestured for him to sit. "Major, do you know why I called you here?" he asked.

"No, sir, I don't." Reiss said. He had decided to play dumb.

"Alright, I'll tell you," Lisle said. "Do you remember the last time I saw you here, last Saturday evening?"

"Yes, sir, I do," Reiss answered. "Of course I do."

"Good. Then you'll remember that I gave you some restricted information, and that I told you not to share it with anyone else."

"Yes, sir, I remember that." Inwardly, Reiss cringed. This might be as bad as he had feared it would be.

"Where did you go after you left my office, Major Reiss?"

"Sir, I went right home. My wife and I had been planning a family trip." Maybe he could talk his way through this, Reiss thought.

"To Lignano, or so I understand," Lisle continued.

"Yes, sir. Lignano. That's right. It's still pretty, even if it is a little chilly."

By now, Lisle was openly staring at Reiss. "Did any other officers from this base decide to join you at the beach, Major Reiss?"

"Yes sir, a few. A few did."

Lisle reddened. "In fact, Major Reiss, more than a dozen other families ended up at that hotel, didn't they?" He rose from his desk. "Why do you think all those families decided to go to the beach on a Saturday night in November, Major? Any idea?"

Reiss shook his head, then shrugged.

"I'm not going to ask you to tell me, Major," the base commander said. "I don't want to put you in the position of having to lie to me. Because if you lied to me, Major Reiss, I'd have to put you up on charges."

Though he wanted to get up and run from the room, Reiss sat very still, his eyes wide. He remained silent.

"You see, I asked some of those officers why they suddenly packed up their families and went to the beach," Lisle said, picking some paperwork up from his desk. "This may surprise you. They all told me it was your idea. They told me you warned them about a nuclear bomb on the Aviano flight line. Did you do that, Major Reiss?"

"No sir," Reiss stammered, "that is … yes, sir. It's complicated. You see, sir … Marge, my wife … sir …"

Lisle silenced him with a gesture. "Major, believe it or not, I already have a pretty good idea what happened," he said calmly. "I'm not going to prolong this conversation. I am going to put a reprimand in your records. If you're smart, you won't challenge it. That's all. You're dismissed."

After that, the base social pecking order changed. Several officers Reiss had considered his friends no longer joined him for drinks after work at the officer's club, or for rounds of golf on weekends. Marge complained that some of her former friends were acting distant, as well. "Did you do something, Harry?" she asked, wide-eyed.

Reiss was passed over for promotion again. His chances on the third round were slim. He was forced to confront the fact that he'd leave the Air Force as a major, retired at his current rank after twenty years of service. Time for reassignment was approaching. He had asked for posting at a base out west, in California, Nevada, or Arizona. His family was from California, and he'd

be able to plan for his post-Air Force career there. He and Marge could look for a house, and see about getting the boys into college.

The orders, when they came, were discouraging. Instead of a west coast assignment, he would be sent to the east coast, to McGuire Air Force Base in central New Jersey. The only bright note: the family would travel home by cruise ship out of Genoa. Marge was subject to severe air-sickness. She could no longer stand long airplane flights. Reiss had joined the Air Force in 1948, right after college. McGuire would be his last assignment.

The cruise home was relaxing. Marge made friends with some of the other passengers, and left him alone most of the time. The boys behaved themselves, though they got drunk and sick on the free Madeira pushed on them by Canary Island wine merchants. The ship docked in New York City and the Reiss family travelled the relatively short drive down interstate ninety-five to his new assignment. They checked into base housing and waited for their belongings to be shipped from Italy. Delivery would take a few months. In the meantime, the family used furniture supplied by base housing— beat-up but serviceable. When their goods finally arrived, there were water damage and breakage issues. Marge was bitterly upset that some of the antiques she had treasured were broken or missing entirely.

Reiss's job at McGuire was very similar to what he'd done at Aviano. The aircraft he dealt with were different—mostly large, multi-engine transports instead of fighters and fighter-bombers. The maintenance process was basically the same. He began to make friends among his new wing's officers, as Marge did among their wives.

As 1968 grew closer, Reiss began job hunting in earnest. Lockheed, the aircraft manufacturer that produced many of the aircraft he helped maintain, was looking for technical representatives to work with their military customers–both in the U.S. and around the world.

The job looked interesting, and Reiss still liked to travel. He applied for the job and won it. His concerns about having to support his family on an Air Force pension disappeared.

Reiss was scheduled to retire from active duty on July fourteenth, 1968. His plans were to move the family to California—somewhere near Sunnyvale, where Lockheed was located. The boys wouldn't be moving with them. Both were already in college, safe from the draft board. He called base transportation in May to begin arrangements for the family's final Air Force move.

Marge had been distant for some time. Reiss hardly noticed. She had always been prone to mood swings, and now menopause had aggravated both their intensity and their frequency. Even so, he was surprised when she confronted him one evening as he prepared for bed. "I've decided to leave you, Harry," his wife said without emotion. "Don't try to talk me out of it. I already saw a lawyer. I'm getting a divorce."

Dumbfounded, Reiss could only stare at his wife. She looked back at him, wide oval eyes unblinking. "Oh, don't act so shocked," she said. "Things haven't been right between us since that stunt you pulled in Aviano. Scared everybody, and probably cost you your promotion, didn't it?"

"Everything would have been OK, if you hadn't told the world," Reiss snarled.

Marge laughed. "If you wanted to keep it a secret, why tell me, Harry? When it was over, Olive cut me dead. My best friend! I could hardly show my face on base after that. It was all your fault, Harry!"

Reiss tried another approach. Arguing wouldn't help. He could see that. "Marge, give this some thought," he pleaded. "Look how well things are going for us. The boys are in college. I've got a good job lined up, at twice what I'm making now. We'll be back in California soon. Give me some time. I promise I'll make things right."

Marge shook her head. “I’m through waiting for you to change,” she said. “The boys in college, hah! One is flunking out. He’ll be in the army within a year. The other was a juvenile delinquent, but he’s smarter. He might stick it out. What makes you think I like the idea of you running all over the world while I sit home? You never bothered to ask me what I thought about your new job. Do you really believe I want to move to California? Do You think I’ll like being near your family again? You never notice, Harry. You never pay attention. I’m not changing my mind.”

As Reiss watched, Marge left the room and returned immediately with some sheets and blankets. “Grab your pillow, Harry,” she said. “You can bunk on the couch until the divorce. I’m not letting you near me anymore.”

She walked to the living room, and tucked the sheets and blankets into the couch to form a makeshift bed. Reiss plodded after her, holding his pillow. “So this is it?” he said. “Three kids, twenty-two years, and it ends this way?”

Marge nodded. “Yes,” she answered, “this is it. Get used to it. By the way, Joan is staying with me. I’ve talked to her, and that’s the way she wants it.”

The divorce proceeded quickly. By the time Reiss was ready to retire, the last forms were signed. Marge would keep the furniture, the newest car, half of their savings. Her alimony amounted to most of his Air Force retirement pay. She got full custody of their daughter, Joan—although Reiss got visitation. Simply put, Marge got everything she had asked for.

Reiss sold the second car, packed his belongings in a suitcase, and caught a plane for San Francisco. By the end of the month he had bought a car, found a furnished apartment, and started his job with Lockheed. His head was still spinning from the changes his life had gone through, and the speed with which they’d happened.

The work of a tech rep for a military contractor can be interesting and demanding. The rep's job is to respond to and take care of technical problems that may arise as the military makes use of his or her company's products, and to explain new modifications or procedures. Reiss enjoyed the work, which was an extension of what he'd learned to do in the Air Force. Now single, he didn't mind travel or long periods away from home. He worked for Lockheed for twenty-two years, retiring in 1990 at the age of sixty-five. He passed away in 2014, from the effects of severe Alzheimer's Disease. Only his daughter Joan attended the funeral.

Jonas Brown

Cassino considered First Lieutenant Jonas Brown to be one of the most talented and capable junior officers he had commanded. He rated Brown high on his efficiency reports and was pleased to see him promoted early to captain. Brown and his family rotated back to a stateside assignment in 1967. The following year he volunteered for service in the Republic of Vietnam. He was assigned to an ordnance depot at Danang Air Base, where he was killed in action during a Viet Cong ground and mortar attack in February 1969—just three months before he was scheduled to return to the U.S. He was posthumously awarded the Bronze Star for his part in defending the munitions bunkers he helped manage. His remains are interred at Rock Island National Cemetery in Illinois.

Androcles "Andy" Gray

Commissioned officers may command the Air Force, but it is the non-commissioned officers who run it. The best units in the Air Force (or any other military branch, for that matter) are those where officers and NCOs work as a team, and where knowledgeable NCOs keep daily

activities running smoothly. Andy Gray was an exceptionally competent master sergeant by the time he worked in munitions at Aviano, a veteran of more than fifteen years of service.

As a young African American from Virginia in 1950, Gray joined the Air Force after Truman's famous Executive Order 9981—through which he sidestepped Congress and mandated desegregation in the U.S. military. Truman's order was no magic wand. There was still plenty of racial prejudice in the Air Force when Gray enlisted, and some would remain for a long time. Even so, as time went by it diminished, atrophied by the hard work of men like Andy Gray.

By the time Gray served with Cassino in Aviano, he had risen to the rank of master sergeant (E-7). He would go on to retire two ranks higher, as a chief master sergeant. His knowledge of munitions, his ability to teach the younger airmen he worked with, and his calm, positive attitude all combined to make him a valuable part of any unit where he was assigned.

After the incident at Aviano, Gray was transferred stateside to Dover Air Force Base, Delaware. After two years there, he was ordered to duty in Vietnam. He would add one more tour in the far east before retiring in 1976, after twenty-six years of service. His children were grown, so he and his wife settled in Roanoke, Virginia, where he purchased a transmission repair franchise. He closed the shop when his wife died, in 2000, and moved to a retirement community nearby, where he still resides.

Dieter Klempf

The incident at Aviano never left Dieter Klempf's mind. To him, it showed the error in logic of designing equipment—machines—that removed the human element from every aspect of an important decision. The B43 in Aviano would have gone off, should have gone off, because all of the automation within the bomb worked perfectly. The wild card, the stupid young pilot who

started the machine, was the only flaw in the process. Without heroic work, work which should not have been successful, that thermonuclear bomb would have exploded and killed thousands.

Klempf taught the details of the incident to every new NEST member he teamed with, and he worked with Sandia engineers to put fail-safes into the PAL device. His work with nuclear devices at DASA continued for thirteen more years. At that time, he was diagnosed with incurable pancreatic cancer. He died in Alamogordo, New Mexico in 1981, at the age of sixty-three.

Dan Cassino

The incident on the Aviano flight line affected Dan Cassino for the rest of his life. He believed it was the closest he had ever come to death—closer even than his encounters with flak and enemy planes in World War II. Others who knew him well said he seemed more detached afterward, less interested in the minor problems that invade every-day life.

Cassino decided to send his family home to the U.S. His wife and children left by cruise ship from Genoa (the same ship that carried the Reiss family) as soon as their oldest son completed his spring semester at college. He would remain in Aviano for another year. Without dependents, he moved into the BOQ (bachelor officer's quarters).

His remaining time at Aviano would have been uneventful, had it not been for the ideas of the base commander who replaced Colonel Lisle that summer. The new commander was an ex-fighter pilot who looked at his tour at Aviano as a stepping-stone to his pre-ordained ascension to flag rank. Upon his arrival, Colonel Cleavinger immediately began looking for ways he could show his superiors how much better he could run the air base. The procedures in place for readiness inspections irked him. Blaring sirens and loudspeaker-bearing helicopters seemed

to him a vastly inappropriate way to bring Aviano Air Base to alert status. Cleavinger decided to devise a better solution.

He conceived an intricate system of alert teams. One man would be assigned to alert three more. Each of those three would alert three additional airmen, and so on. No sirens would be sounded. No helicopters would be sent out to blare notice of the alert around the Po Valley. Cleavinger called his system “the covert alert.” Several drills were run. The new system was considered to be perfected. The new base commander was sure inspectors from Ramstein would find it an immense improvement over the old ways.

He was wrong. The drills had all been carried out during the regular work week, when most airmen were at their workstations. The inspectors showed up eight weeks after Cleavinger took over command, on a Saturday evening. Several of the initial covert team members could not be found. Some were on weekend trips to Venice, Verona, or other Italian tourist destinations. Some were at the beach in Lignano. The team concept collapsed. In a frantic effort to save the situation, the sirens and helicopters were finally used. Too late. Aviano failed its readiness inspection miserably.

Cleavinger was not relieved of his command. His superiors at Ramstein understood the intent of his effort and decided to give him another chance to succeed. His subordinates waited for him to throw out the “covert alert” scheme and revert to the old, proven methods. They were disappointed. Instead, Cleavinger worked hard to find new ways to make the alerts he knew would come easier to pass.

The new base commander decided that a major time constraint was the lengthy period needed to transport nuclear bombs for his aircraft from Cassino’s storage bunkers to the Aviano

flightline. If the bombs could be stored on the flightline, precious minutes could be saved. The alert could be passed with plenty of time to spare!

Cleavinger ordered cages for the Aviano nuclear bombs to be built on the flightline itself. Once the ordnance was stored within them, they would be guarded twenty-four hours a day. When the cages were constructed, he ordered Cassino to stock them with bombs.

Cassino refused, noting that such storage violated both nuclear safety and security regulations he was duty-bound to uphold.

"As your commander, and as a superior officer, I'm giving you a direct order," the base commander told him. "Refusal will be insubordination."

"I will comply under duress, sir," Cassino told him. "I'll need the order in writing, placed in the unit's Order Book." Cleavinger grudgingly agreed.

When the next readiness alert took place, inspectors from Ramstein marveled at how quickly Aviano's jets were loaded with their nuclear ordnance. Cleavinger was proud to tell them about his flightline storage innovation. Cassino was immediately asked why he had allowed such a practice, and showed the astounded inspectors the written order he'd been compelled to obey. "You're off the hook," they told him, shaking their heads. This time there would be no reprieve. Cleavinger was sacked. Lieutenant Colonel Dan Cassino replaced him as interim base commander, until a permanent successor could be appointed.

Cassino remained base commander at Aviano for the remainder of his tour. He immediately reintroduced the tried-and-true alert program that had worked at the base for years. His abbreviated watch was quiet, except for the famous "De Gaulle's Grass" incident—which has left its mark on the base from then until now.

France had long felt slighted by her status in NATO, pushed aside by the special relationship between the United States and Great Britain. By 1966, the French fleet had already been removed from NATO control. U.S. and British nuclear weapons were banned from storage on French soil as well. In a final effort to establish military independence, France gave the U.S. and Canada a year to vacate all their aircraft and support troops from French bases, which would return to local control by 1967. De Gaulle's demand would be difficult to accomplish. Hundreds of aircraft, thousands of airmen and their families, as well as tons of supplies, bombs, and other materiel would have to be removed. The result was a gigantic, costly logistical operation that only barely met its schedule.

Still, even in such hectic times, a possibility for gain existed. Cassino heard from the commander of Toul-Rosieres Air Base, who lamented having to leave behind the beautiful golf course that had been the pride of his command. An idea percolated through U.S. Air Force Command and became reality. With the aid of some airmen at Toul, as well as a large crew of his own, Cassino determined to move the valuable grass of their golf course to Aviano, where it was sorely needed. Of course, not all the grass would be removed—only the manicured lawns of the greens and tees. Still, the rolled-up turf filled three big C-130's sent north to do the job, with little room left for the Aviano volunteers who had flown in them to do the work. It took a lot of effort, mostly in the dark of night, but within in a week the gorgeous green carpets from Toul sat in northern Italy—ready to be unrolled and planted on the Aviano golf course, where they still grace the base's course today. To say that the incoming French landlords took this midnight appropriation kindly would be grossly inaccurate. They were furious that the Americans could leave their base and take their golf course with them.

Aviano would be Cassino's last military assignment. He had decided to retire from active duty. Many factors weighed upon his decision, but chief among them was the recurring hollow pain he felt in his chest. It was the same pain he had first noticed flying B-26's in World War II, the same pain that eventually took him off flying status. Now, it occurred more often and felt sharper, less bearable. That, plus the memory of that agonizing night on the Aviano flight line, made up his mind.

He had been offered a good job with General Electric Aerospace in Philadelphia, and decided to accept it. His wife could buy the house she'd always wanted in the mainline suburbs, and the family could settle there. Within a year, he was out of the Air Force and working for G.E.'s re-entry systems facility on Chestnut Street, as a lead engineer on their new MIRV (Multiple Independently Targeted Re-entry Vehicle) program. He and those around him raced to save the effectiveness of the nation's intercontinental ballistic missile deterrent.

Early intercontinental missiles carried one warhead each. As they come online, both Soviet and U.S scientists immediately began work on ways to shield their targets—to intercept the incoming warheads. Though theoretically possible, such interception would be incredibly difficult, the rough equivalent of hitting one rifle bullet with another. Still, work proceeded—on the interceptors themselves, as well as the high-speed computers to guide them, and the improved sensors to find their targets. Eventually, the threat of intercontinental missile bombardment would be marginalized or erased by "anti-missile" defenses, it was thought.

Other minds had a different response. What if each incoming missile carried more than one warhead, they asked. If that were the case, the offensive threat could always overwhelm available interceptors, by weight of numbers alone.

The earliest multiple re-entry vehicles were not independently targetable. Once released from their "bus," each would arc on a ballistic path without deviation. However, by 1968 the U.S had successfully tested buses that could carry several independently targetable warheads, and these began to replace single warheads in Minuteman squadrons in 1970. Cassino's knowledge of previous warhead designs, as well as his wealth of experience in nuclear weapons, made him a valuable part of General Electric's MIRV effort. He was part of the team that brought these weapons into the U.S. deterrent on time and on schedule. Their impact was extreme. Used in a first strike, MIRVs could overwhelm any defensive efforts and destroy enemy missiles to largely minimize any counterstrike. Until the Soviets were able to MIRV their own missile fleet, their forces remained at a dangerous disadvantage.

Still, once the new systems were in production, the program lost both emphasis and funding. The Vietnam War effort was winding down, and military spending was declining. In 1971, G.E. ended work at Chestnut Street, and Cassino's job was terminated.

His life after G.E. waxed and waned. He faced both bankruptcy and the possibility his marriage would not survive this latest stress. Still, he remained resilient. He went back to school and got his master's degree, while moving up the executive ranks at a local asbestos pipe manufacturer. In time, defense spending rebounded, and he won an aerospace management position with Grumman. Cassino worked on logistics support planning for the "wild weasel" F-111 conversion and the C-2 "Greyhound" transport. Later on, Lockheed hired him to work on the planned west coast space shuttle launch facility. Finally, in 1984, he decided to retire in earnest. He and his wife moved to Tucson, Arizona where they bought a tidy eastside casita. He remained restless, and continued to find part-time work to keep himself occupied. In 2002, the couple

decided to move back to New York, to a tiny Long Island apartment closer to his sons and oldest daughter—all now married, some with families of their own.

The next two years rolled by. Cassino spent much of his time watching his beloved Yankees on TV, or making his superb pasta sauce and lasagna for guests and family. He sometimes worked as a teaching assistant with children at a local school.

In October 2004 Cassino suffered renal failure. He began weekly dialysis treatment, but his health continued to deteriorate. The following January, he was diagnosed with heart disease and admitted to a local hospital. Cassino succumbed to heart failure on March 2nd, 2005. He was eighty-five years old when he passed away. His cremated remains are interred at Calverton National Cemetery, in Wading River, New York. There are few visitors.

Epilogue: How an Aviano Detonation Might Have Changed the World

The incident at Aviano could easily have ended much differently. The B43 under Randy Simms's Phantom II was fully activated, ready to explode. Once Cassino and his team removed the bomb's fuse, any sufficient impact or vibration might have been enough to set it off.

Suppose, for instance, that clouds over the Po Valley gather and darken, threatening heavy rain. Scores of lightning bolts flare over the Aviano flight line in this alternative history. One particularly strong discharge occurs immediately over the base. As the lightning flashes, Cassino begins to count silently … one thousand one … his count never reaches one thousand two. An incredibly loud clap of thunder explodes, immediately above his head. He looks at Gray and Brown, opens his mouth to speak, but his world ends before he can utter a sound.

The thunder has set the bomb off. In that instant, Cassino, his team, the Aviano flight line and most of the base around it, as well as some of the village and farmland beyond, cease to exist. They have become loose, free atoms that rise with the fireball from the crater now forming where they had been, which will reach a diameter of two-thirds of a mile as it rises over the devastated northern Italian countryside.

The village of Aviano itself is totally destroyed. Even concrete buildings are collapsed by massive overpressure, while fire and radiation kill all inhabitants. Heavy building damage and heavy casualties from radiation, severe burns, flying glass, and blindness are felt as far away as the surrounding communities of Piancavato, Roveredo, Sedrino, and Nave. In all, more than five thousand people die. An additional twelve thousand are injured by flying objects and collapsing structures. Even substantial concrete structures within three miles of the explosion have been demolished or completely collapsed, killing all inside. Deadly radiation (five hundred rems) extends almost four miles from the epicenter. As far away as seven miles, residential

buildings have collapsed. Blindness from the explosion's flash and third-degree burns have maimed people as far as eighteen miles distant. All of this would have occurred in a relatively rural place with few roads and no major highways. Medical and humanitarian relief would have found entry to the blast-torn area difficult.

The cloud created by the blast climbs to more than thirty thousand feet before flattening to an emblematic mushroom forty miles in diameter and a mile thick. The heaviest pieces of fallout—hundreds of tons of dirt, rock, plants, and people—soon begin to fall to earth as it roils. Lighter particles, blasted by intense radioactivity, begin to drift north and east in an enormous pyro-cumulus cloud, hot and dense enough to cause its own weather. As the cloud drifts toward Austria and Bavaria, it slowly salts the towns and farms beneath it with the fallout it carried. Eventually, the cloud's wispy remainder circle the globe—increasing deaths from cancer as it travels.

Harry Reiss and his family are well south of Aviano on their way to Lignano when an earthquake-like shudder throws their car from one side of the two-lane road they're on to the other. Reiss pulls off the road, rises from the car and looks north. A fulminating, terribly bright cloud is already boiling and rising as he watches. The low echo of the detonation can be heard even this far away, and the trees sway around him. "My God," he says, "it happened."

"What's going on out there, Harry?" Marge asks with a yawn. She had been sleeping.

"Get the map out of the glove compartment," he tells her. "Change of plans. We're going to the Army base at Vicenza. I'll need directions to get there."

"Vicenza?" she asks, frowning now. "Why? That makes no sense, Harry."

“It makes perfect sense,” Reiss says as he climbs back in the car, “now that we’re refugees."

Dieter Klempf gets word of the Aviano detonation while his plane is still over the Atlantic. He sighs. The worst has happened, just as he and others like him had long dreaded. So many bombs, so many hands touching them. It was only a matter of time before someone made a terrible, fatal error. He reads the message he’s been given further. He and his team will proceed to Ramstein. They will contribute to efforts to find and salvage any nuclear weapons remaining at Aviano.

The fields and forests of the Po Valley continue to burn sullenly through the night and into the following day. Some of the farmers and villagers spared from immediate death from blast or fallout leave their shelter to make their way to supposedly safer places, only to die from radiation exposure in the attempt. Initial attempts to bring aid to stricken communities fail. Roads are blocked by debris and dying refugees. Remaining radiation turns those trying to help into additional casualties. Communication with the area has ceased. Days later, when better managed efforts begin to define the immensity of human suffering and death around Aviano, the world is stunned. Humanity has become desensitized to the immense destructive power of nuclear weapons since Hiroshima and Nagasaki. Now, the reality of that terrible force stands before everyone again—impossible to ignore.

Though domestic and international aid begins to arrive, efforts to help are dwarfed by immensity of the catastrophe. There are not enough free hospital beds in all of Italy to absorb the

casualties beginning to trickle out of the Po Valley. Italian health facilities are quickly overwhelmed. The death toll climbs.

Within a week, protests erupt around the world, especially in nations that have U.S. military installations. In Italy, the Moro government quickly falls, replaced by a communist-led coalition under Palmiro Togliatti. The enormity of the disaster leads to massive protests across the breadth of the Italian peninsula. Public pressure pushes Togliatti to call for all U.S. nuclear weapons to be removed from his nation's soil. He also demands a full inspection of all U.S. facilities. Any response short of immediate agreement threatens ultimatums for the U.S. military to leave Italy, and for Italy to abandon NATO.

Up to this point, the events projected are relatively predictable, given the volatile Italian political climate and the terrible nature of the incident. Plotting alternative history beyond this juncture is less certain. Given the vagaries of international geopolitics, any number of timelines might have sprung into being. Here is one that might have occurred, based global dynamics as they were in 1965-66:

Even after receiving warm assurances of support from Leonid Brezhnev and the Soviet Presidium, the Togliatti government pauses before fully committing to the embrace of Soviet Communism. There is heavy pressure from other western European nations—as well as from the United States and Canada—to return Italy to NATO's fold. Neither course holds appeal, either to Togliatti or the people he now governs. Italian Communism is far removed from the Soviet model. While a far-left policy shift might prove acceptable to his base in the central provinces north of Rome, the rest of Italy would rebel against it. On the other hand, a return to NATO would undoubtedly bring down Togliatti's government.

A meeting requested by the Yugoslav ambassador promises an answer. Tito beckons his western neighbor to join his nation in socialist neutrality. This "third path" would lend strength to both Italy and Yugoslavia, while at the same time muting the cries for closer linkage from east or west. Togliatti grasps the opportunity. He and Tito meet in Belgrade to sign a treaty of mutual economic and military support. "Europe no longer has to stand in the shadow of foreign powers, east or west," Tito declares. "There is now a third path that leads to true neutrality and independence."

A year later, Greek putschist Georgios Papadopoulos announces that his government has signed joint security treaties with the Third Path. Turkey, ever suspicious of Greek intent, demands that NATO take immediate action against Third Path nations to curb their ascendancy.

NATO has limited options. Italy's exit has left few alternatives for Mediterranean ports to base the U.S. Sixth Fleet. Spain is out of the question, since further use of their harbors will lead to immediate popular unrest. Crete and Malta are both reluctant, and Cyprus is at least partially under Greek control. Without sufficient facilities to base, maintain, and refurbish the fleet, little leverage can be exerted. (Eventually, the fleet will be deactivated. Its assets will be assigned to the remaining operational U.S. Navy forces.)

Sensing NATO's inability to react, Turkey attempts to invade Cyprus in 1968. Greek forces, aided by air and naval elements from Italy and Yugoslavia, repel the invasion at its beachhead. Turkish casualties are high. Many invading naval vessels are sunk, and several aircraft are destroyed. Turkey tries in vain to invoke Article Five and bring U.S., French, and British forces to her aid. When this does not occur, Turkey repudiates and leaves NATO. Greece consolidates victory in Cyprus, forcibly deports thousands of Turkish Cypriots, and joins the

Third Path, which now becomes three nations strong. NATO's presence in the Mediterranean is largely dissipated. Later in the year, Albania joins the alliance as well.

The following year, a Soviet supported Turkish force invades eastern Greece. The combined weight of Greek, Yugoslav, and Albanian troops throws back the invading armies and moves into western Turkey. Believing their time has come, Turkish Kurds rise up in that nation's southeastern provinces. Forced to fight a war on two fronts, the Turks are defeated and pushed back to the Bosporus, where a cease-fire line is finally drawn under United Nations supervision.

Now a growing influence in the Mediterranean and Europe as a whole, the Third Path determines to make itself unassailable. Military and naval production is increased, and standing armies in member nations are enlarged. The missing element—a nuclear deterrent—is also addressed. Prior to the Third Path initiative, both Yugoslavia and Italy had pursued independent nuclear weapons programs. The Soviets had contributed more than one hundred pounds of fissionable material to Tito's Vinca Institute, the site of a six-megawatt reactor. Some preliminary work had also been done at the Krsko power plant in Slovenia, under the direction of the Josef Stefan Institute. Italian nuclear weapons development had begun using the Galileo Gallei test reactor, and plans were underway to test Alfa, a nuclear-capable ballistic missile with a range of almost a thousand miles. Individually, none of these programs had the funding or attention necessary to achieve success. Now, nurtured and funded by the combined Third Path alliance, they do. The Italian Navy begins successfully firing Alfa missiles in 1971. In 1973, after a five-year effort, the first Yugoslav-Italian nuclear device is detonated on uninhabited Maun Island in the Adriatic. Two years later, their first thermonuclear device explodes on Prvic—another lifeless Adriatic rock. By the end of the decade, Third Path nuclear missile silos begin to dot the Italian Dolomites, the Rhodope mountains of Greece and Yugoslavia, and the

Tagetus mountains of Sparta. Every major Eurasian population is within their range. A powerful nuclear force has come into existence. The world has moved further from the promise of peace, closer to the edge of war.

In this alternative history, the year is 1985—twenty years after the appalling incident. At the former site of the village of Aviano, where the horror of a nuclear mistake reshaped the world, a monument has been erected. It stands beside the massive crater, which has a diameter of over half a mile and a maximum depth of more than one hundred fifty feet. Now filled with shimmering water, it has become a placid lake. A neatly kept cemetery lies in back of the lake, where plain white crosses mark the final resting places for thousands of souls who once lived and worked in and around the village. Tens of thousands of visitors come every year to view this silent quiet place, to stand beside the manmade lake and contemplate the monument. A special ceremony is held every November, when people from around the world come to pray for the end of the weapons that caused this tragedy to occur. Beyond the lake and the monument, a few miles away, behind a well-guarded gate, lie missile silos.

Sources

Unlike previous eras, when lengthy research in good libraries was required to answer all the questions a writing project like this one unearths, most of the work supporting ***Nuclear Warrior*** was done from my desk. Almost every question was answered using *Wikipedia.com*, the excellent online tool I recommend to anyone embarking on a similar project these days. The breadth and depth of the resources within this website are truly astounding. Coverage of the U.S. nuclear program is expansive and enlightening.

A few books were consulted as well:

- Steve Olson's excellent history of Hanford, Washington (***The Apocalypse Factory***, © 2020, W.W. Norton) provided excellent background on the Manhattan Project's scope.
- Richard Rhodes' Pulitzer winning books on the history of our nation's nuclear programs (***The Making of the Atomic Bomb***, © 1986, Simon and Schuster; ***Dark Sun***, © 1996, Simon and Schuster) painted the tapestry of how nuclear weapons came to be.
- Matthew Parker's riveting examination of the battle for Monte Cassino in World War II (***Monte Cassino***, © 2005, Anchor) described in detail one of Dan Cassino's most important missions.

In addition, examination of my father's military records and conversations with family members and others who knew him were important to the development of this book.

Photographs and Diagrams

The photos and diagrams on the following pages refer to the bombs, aircraft, places, and people germane to this book. Source for most is Wikipedia. Personal photos and pictures of Dan Cassino's World War II bridge score/diary were provided by his wife, Claudia, and my sister, Caroline—who took charge of the family records upon her mother's passing.

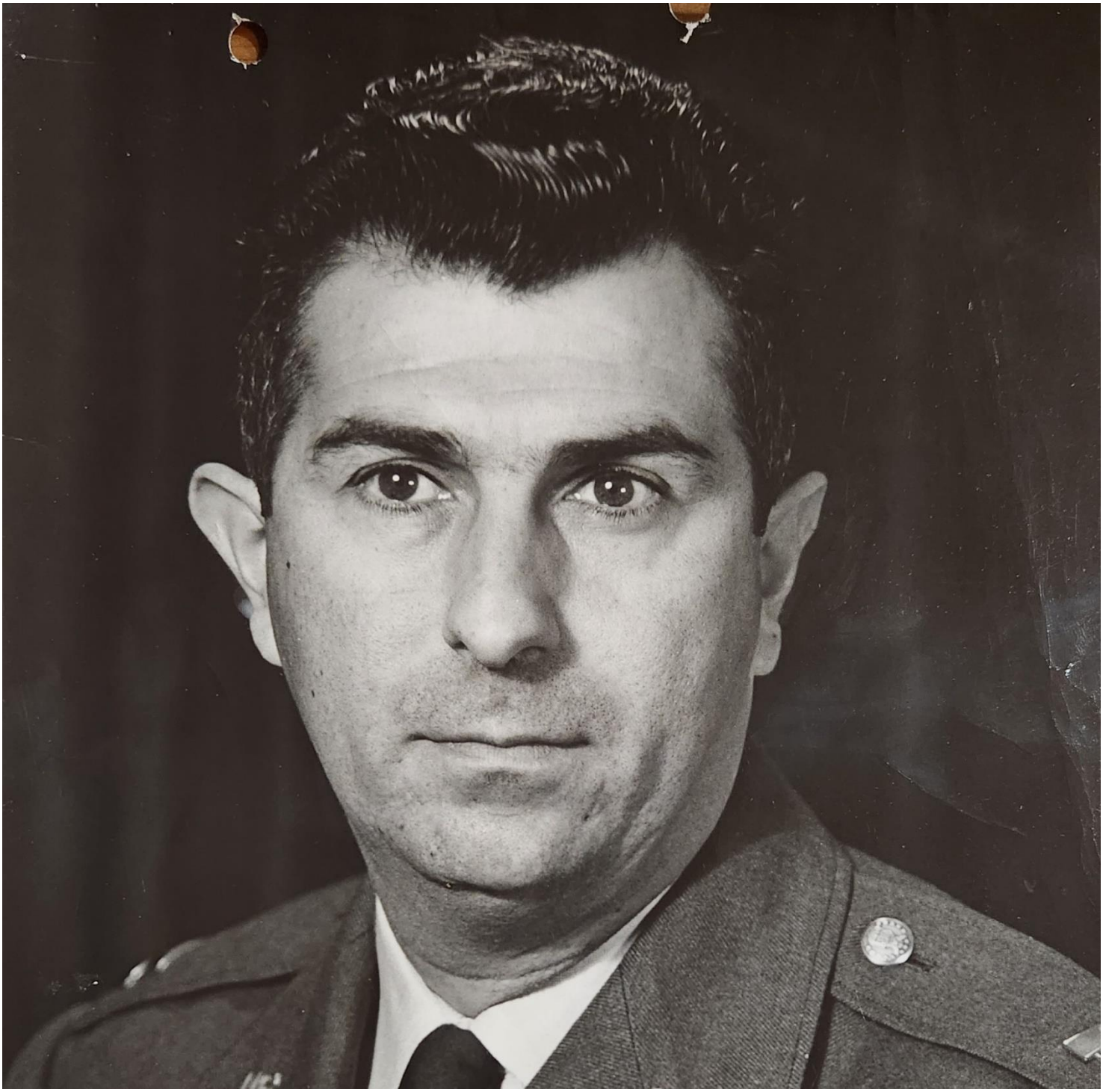
Dan Cassino as a brand-new cadet, on his way to officer training in Miami, circa 1942. Thousands of young men like him were pushed through training to man the aircraft desperately needed to fight World War II. Cassino would go on to fly B-26 Marauders as a navigator in Europe.

Claudia Alvord at 17. She would soon meet a young aviator, just returned from the war—as he played bridge with her father at a Houston Country Club.

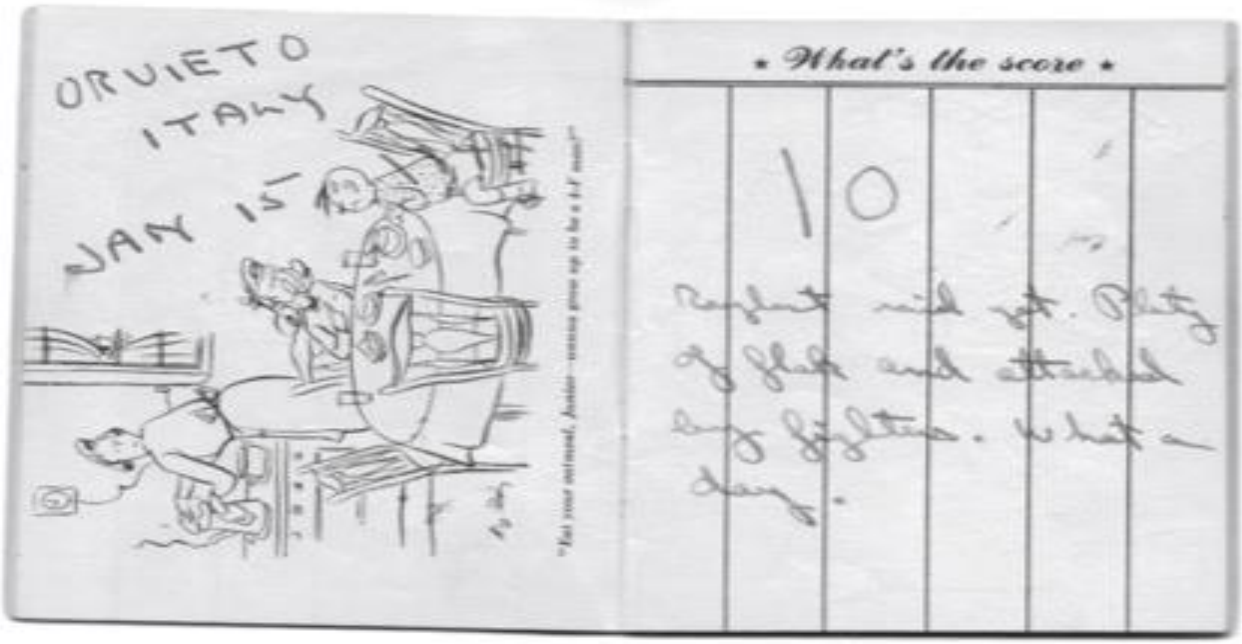
Dan Cassino would marry Claudia in 1945, soon after the war in Europe had ended. They would remain together until his death in 2005, in Long Island. He was 85 years old.

Claudia lived on until succumbing to the ravages of COPD in 2022, at the age of 94, in Tucson, Arizona.

Back in the service in 1952, Dan and Claudia share an evening out at the March AFB Officer's Club, in Riverside, California. Cassino's Air Force career would last until 1966. He would eventually retire as a colonel, after two decades as a nuclear warrior.



Cassino at Vandenberg, a few years before his terrible confrontation with a live nuclear bomb in Aviano. He looked much the same that blustery afternoon in November 1965. By the time this photo was taken, he had become a dedicated, “by the book” nuclear warrior. “If he was left out in the rain,” one critic complained, “he’d rust.”



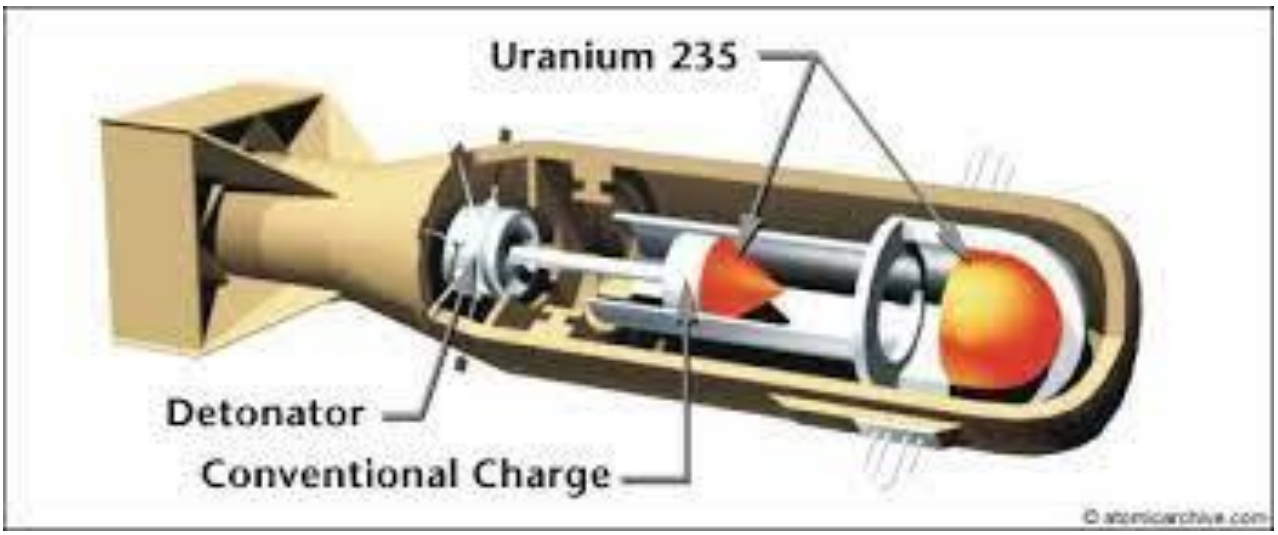
An inveterate bridge player, Cassino recorded the missions he flew for the 320th in a bridge score book. This page shows one of his crew's toughest missions, to the bridge at Orvieto. It was his tenth, out of sixty-three flown.

"Little Boy" and "Fat Man"—the original atomic bombs. "Little Boy" (left) was a gun-type design, dropped on Hiroshima. "Fat Man" was an implosion design, first tested in New Mexico and dropped on Nagasaki.

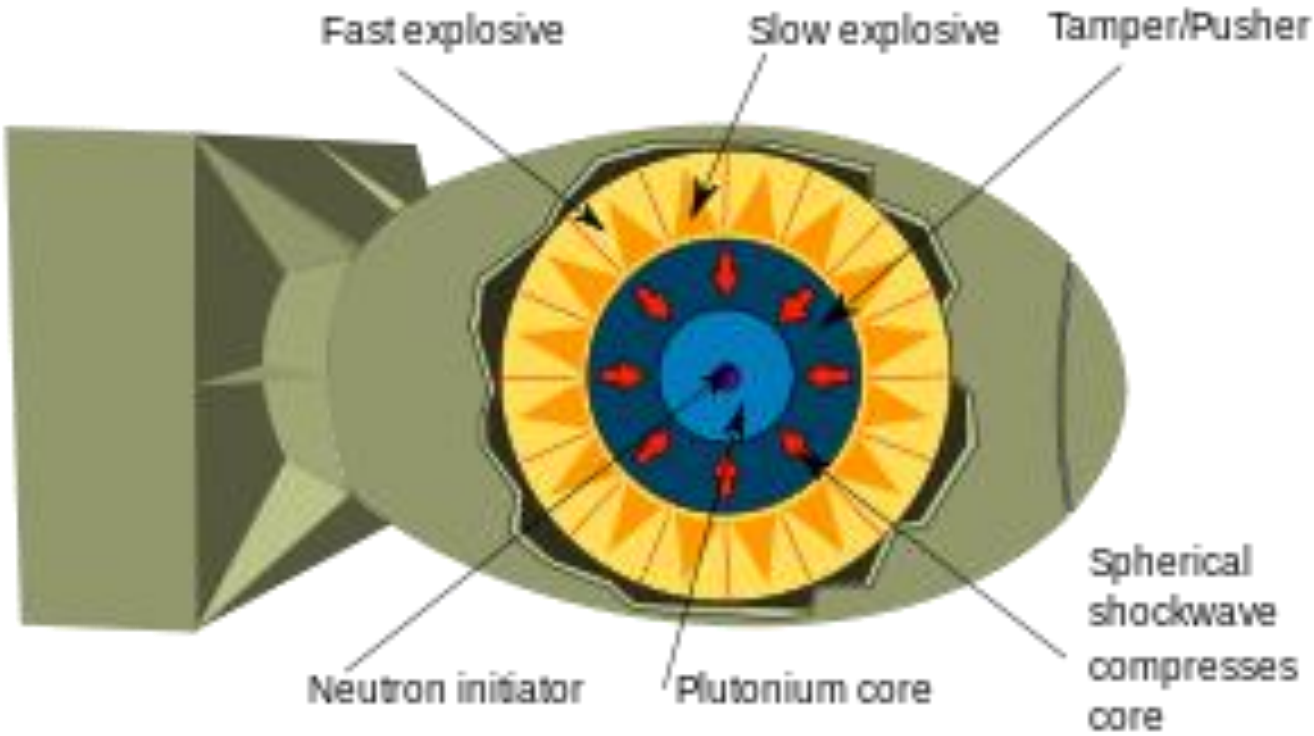
The “Thin Man” design for a gun-type plutonium bomb—eventually rejected because critical mass would not have been reliably achieved.

Instead, the more complex implosion design used for “Fat Man” was selected.

The “birdcage.” Early atomic bombs, like the Mark 4 and Mark 5, kept their nuclear “pits” stored separately, in containers like the one shown. The implosion pit would be inserted into the bomb during flight, under IFI (inflight insertion) procedures.



The gun-type nuclear bomb design used for “Little Boy’ and later for the Mark 8 bomb.

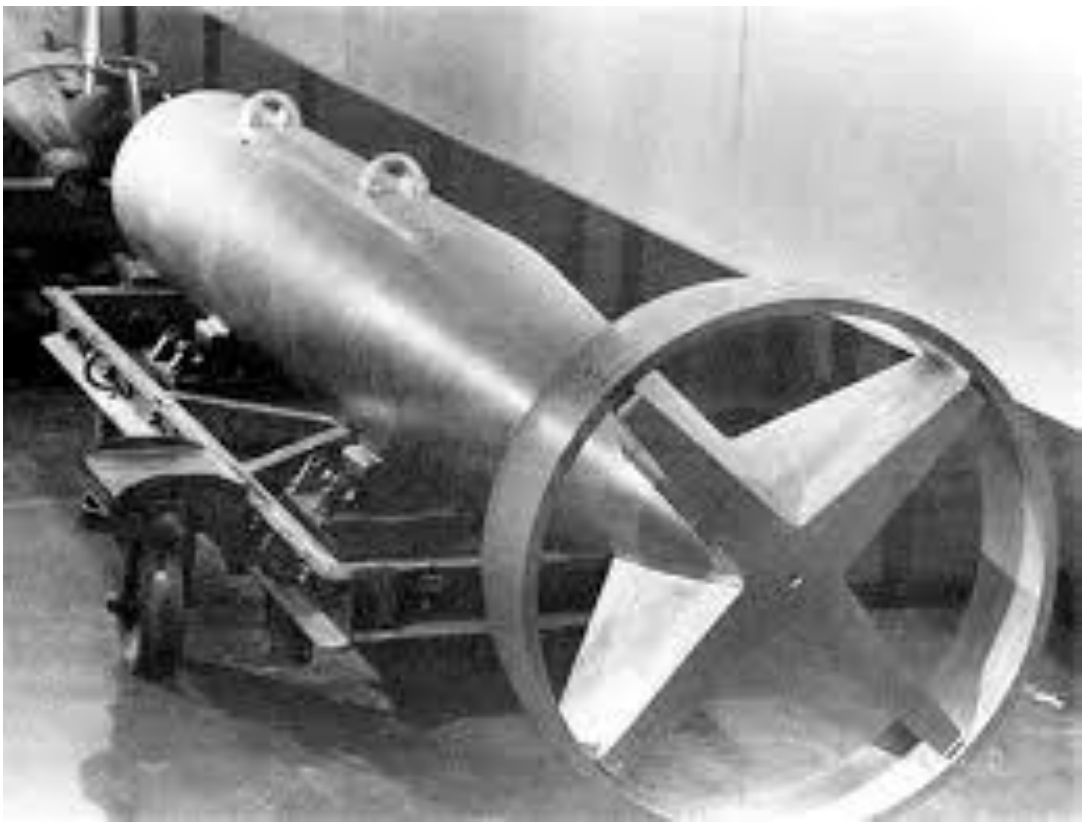


The more complex, but ultimately more reliable implosion design was chosen by Los Alamos scientists for “Fat Man” and most subsequent atomic bombs. The implosion design used less plutonium as well.

The Mark 4 atomic bomb—standard inventory for the first years of the Strategic Air Command. More than 500 were produced before the weapon was phased out in 1953.

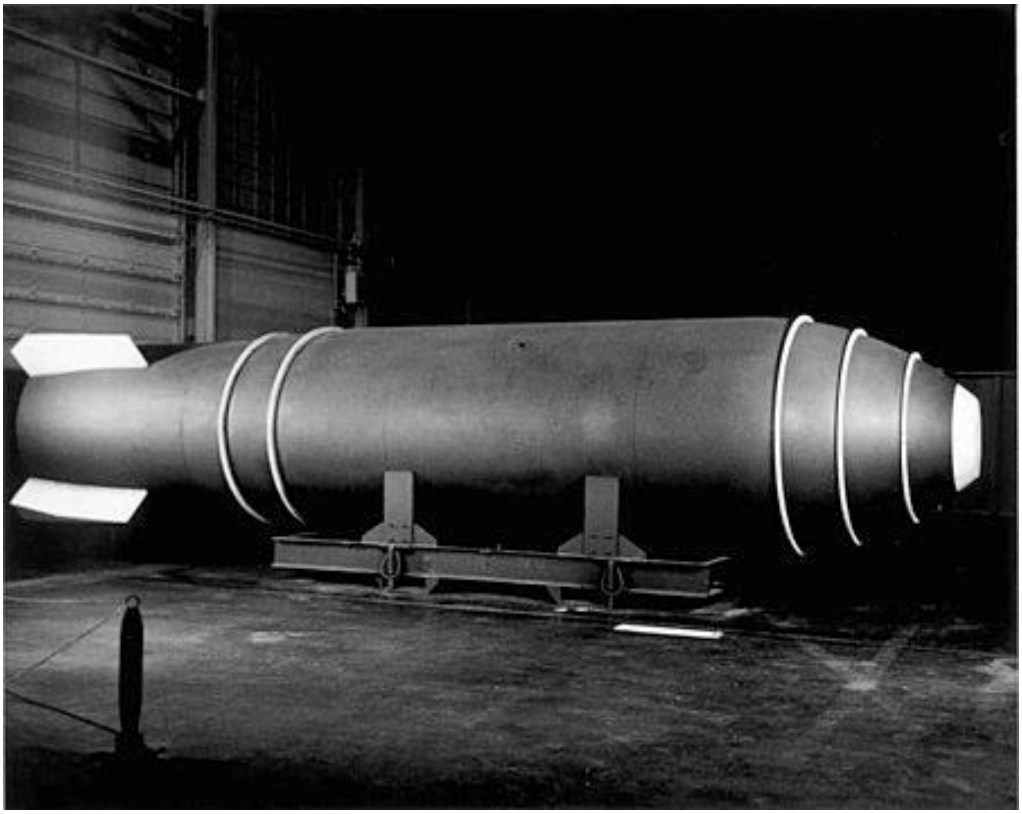
The Mark 5 bomb, designed with clam-shell doors to allow "IFI"—inflight pit insertion. This was SAC's standard atomic bomb during much of the 1950's. More than 500 were produced.

More than 1,000 Mark 6 bombs were eventually produced, redesigned to allow a wide selection nuclear pits with varying explosive yields.



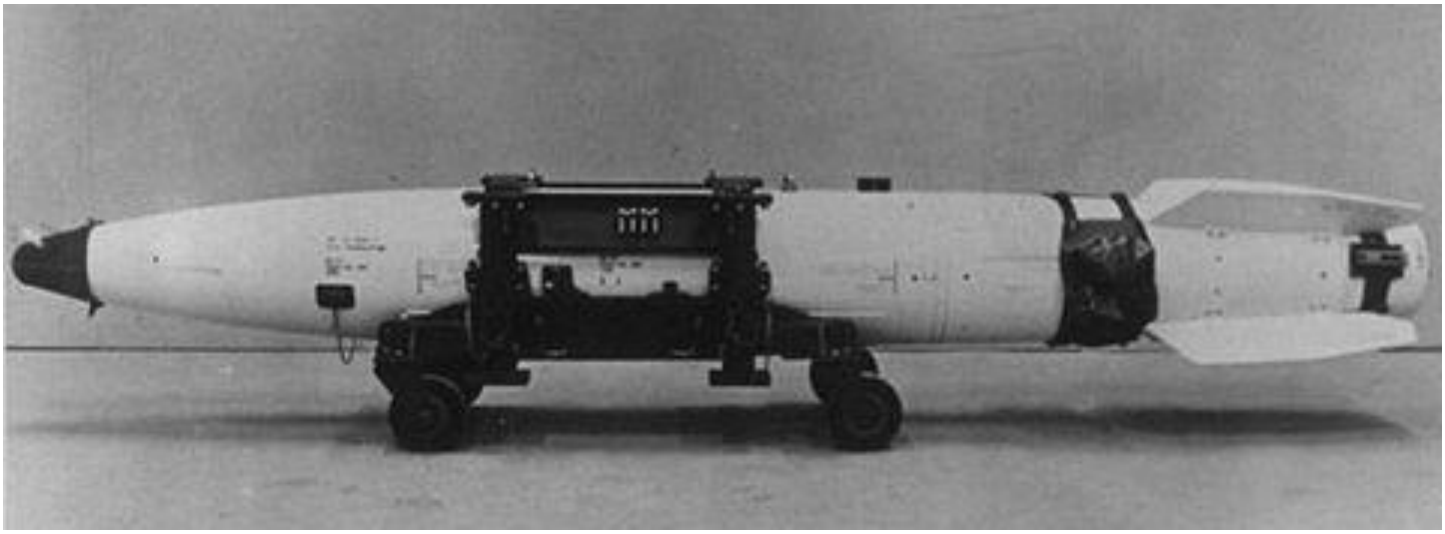
Only 40 “bunker buster” Mark 8 bombs were fabricated—the only bomb in SAC inventory during the ‘50’s that used a gun-type mechanism.

Weaponized—but only barely so. The Mark 14 was SAC's first operational thermonuclear bomb. Almost 20 feet long and weighing over 13 tons, the giant could only be carried by enormous B-36 bombers. Only five were built and each had a yield of almost seven megatons.



More than 300 Mark 17 and Mark 24 thermonuclear bombs were produced. Bigger and heavier than even the Mark 14 (25 feet long, weighing 21 tons), each could yield the explosive power of 15 megatons of TNT.

Far smaller and lighter than the Mark 17, the B28 was the first “modern” thermonuclear bomb in U.S. inventory. Its lower weight (less than two tons) meant that variants could be carried by literally every U.S. Air Force or Navy combat aircraft. More than 4,000 were produced. B28’s were the primary nuclear weapon in SAC’s arsenal into the early ‘60’s—when they were replaced by the B43.



A B43 like the one that almost blew up Aviano Air Base. This bomb improved on its B28 predecessor in several ways. Besides its more reliable Tsetse initiator, the B43 was a “dial-a-yield” weapon that allowed several explosive settings. More than 2,000 were produced before the B63 replaced it in Air Force and Navy arsenals.

Martin's B26—the medium bomber Cassino flew as navigator in World War II. Called by some "The Flying Prostitute"—because its short wings offered "no visible means of support," the Marauder nonetheless enjoyed an exceptional survival rate during the war.

Boeing's B-29—the world's first atomic bomber, took nuclear weapons to Hiroshima and Nagasaki. Less than 200 specially modified "silver plate" versions were in service when Curtis LeMay inaugurated the Strategic Air Command. This is the last aircraft Cassino flew as crew during his Air Force career.

Convair's B-36—with a wingspan of 230 feet and length of 162 feet, one of the largest combat aircraft ever produced. The giant bomber could haul more than 80,000 pounds of bombs 10,000 miles without refueling. This was the only aircraft that could hold SAC's earliest H-bombs, the Mark 14 and Mark 17.

Sleek, as fast as many fighters of the day, Boeing's B-47 formed the backbone of SAC's deterrent bomber fleet in the mid– to late 1950's—until bigger, longer-ranged B-52s began coming online.

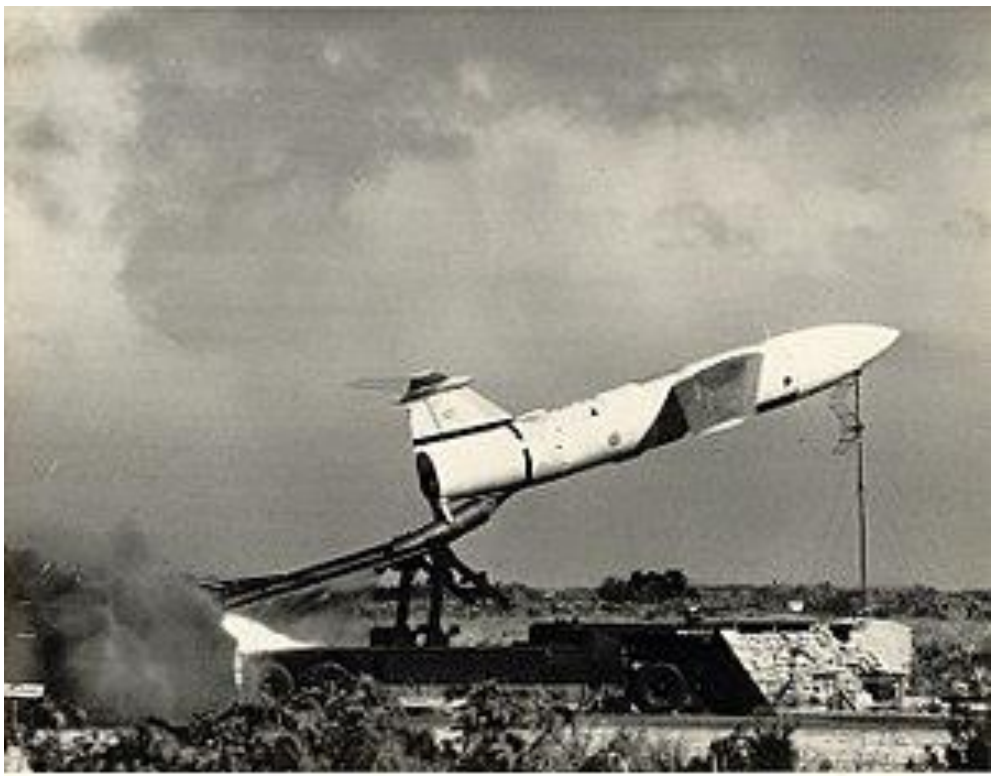
Boeing's B-52—successor to the B-47, still in operational use today after more than 60 years of service. With upgrades and modification, the old "Buff" is forecast remain in service two more decades.

The big Douglas C124 Globemaster II—Cassino's ride on many assignments for the 3079th Aviation Depot Wing, Wright-Patterson Air Force Base. The plane's enormous clamshell doors could swallow even the gigantic Mark 17 thermonuclear bomb.

A plane much like this World War II era C-47 “Gooney Bird” flew Cassino and his family to Aviano Air Base in 1964.

The McDonnell-Douglas Phantom II—one of the nation’s most durable and widely used fighters from the ‘60’s through the ‘80’s. More than 5,000 were built for U.S. Air Force, Navy, and Marine Corps use. This is the aircraft on alert that fateful day in November, 1965 at Aviano Air Base.

The Nazi V-1 “Buzz Bomb”—the world’s first mass-produced pilotless bomber, ancestor of Matador, Regulus, Mace, and Snark.

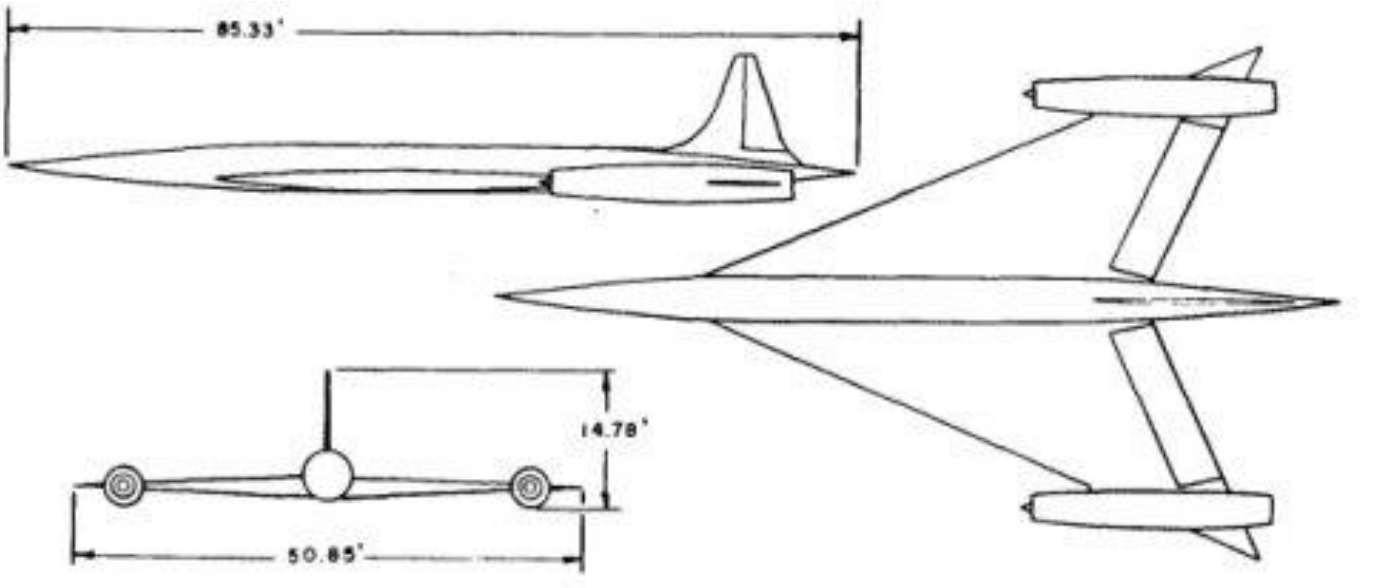


Martin’s TM-61 (MGM-1) Matador, an unmanned bomber deployed to Europe and Asia during the ‘50’s and early ‘60’s. Armed with a modified Mark 5 nuclear warhead, the jet was guided by radio.

Interservice rivalry produced the Regulus SSM-N-8 missile to compete with Matador. Both shared the same warhead, engine, and guidance system. Regulus was launched from U.S. Navy Submarines and surface vessels.

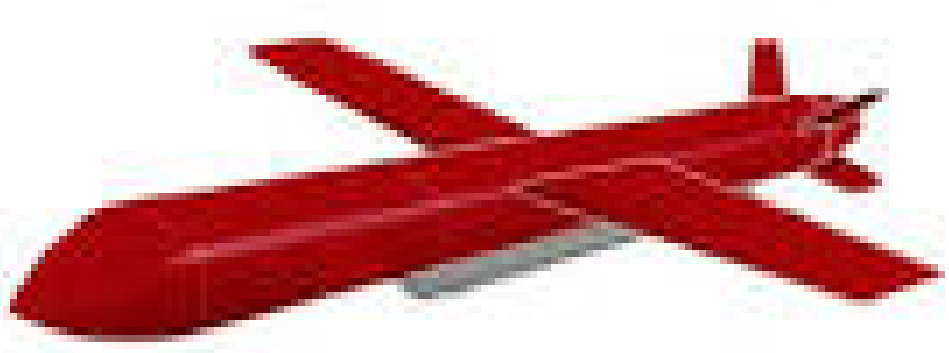
Martin's TM-76 (MGM-13) Mace improved on its Matador predecessor—it was faster, had a much-improved guidance system, and a more powerful engine. Mace filled gaps in the U.S. nuclear deterrent until rocket-propelled missiles came online.

Northrop's SM-62 Snark—a very large, intercontinental, pilotless jet bomber, inaccurate due to the poor maps available to its guidance system. Briefly in service, the 65-foot-long Snark was outclassed by the ballistic missiles already coming online by the time it became part of the national deterrent.



Boojum—Northrop's concept for Snark's big brother: a supersonic, ramjet powered, intercontinental pilotless bomber capable of supersonic speed. Designed but never built, Boojum would have shared Snark's inaccurate celestial navigation system.

A scale model of SLAM (Supersonic Low Altitude Missile)—the nuclear-powered pilotless ramjet envisioned by Project Pluto. SLAM would have carried sixteen nuclear bombs, and would have devastated land it flew over at low altitude with its radioactive exhaust. Engine tests were successfully conducted before the project was cancelled.



Russia's ***Burevestnik*** (Petrel)—a pilotless bomber in the tradition of Project Pluto. Also powered by nuclear ramjets, but somewhat smaller (39-foot wingspan), this weapon has undergone flight tests with only limited success reported. Several Russian military were reportedly killed trying to raise a test vehicle from the seabed where it had crashed.

The Douglas Thor Intermediate Range Ballistic Missile (IRBM). This shorter-range weapon was deployed to the United Kingdom until longer range Atlas and Titan missiles were brought online. Removed from service as a strategic weapon in the ‘60’s, Thor remained in use as an anti-satellite weapon and (as Delta) as a satellite launch vehicle until recently.

This was the missile Dan Cassino was trained to use at Vandenberg, where he instructed British officers who deployed the system.

General Electric's Mark II reentry vehicle, which used shockwave formation and a thick copper heat sink to protect the warhead beneath it from the enormous temperatures generated from hitting the atmosphere at speeds of 25,000 miles per hour.

Appendix A: Dan Cassino's World War II Bombing Missions

Cassino's pocket diary—a converted bridge score book—is a whimsical document. Its pages are filled with cartoons from the era, meant perhaps to entertain card players as they kept track of their points. All sixty-three of his missions were recorded, some with comments about the missions. All are shown below, in order, by date (when dates were recorded), with any comments he wrote.

An asterisk (*) indicates a mission flown in France. Members of the 320th were awarded the Croix de Guerre for their support of French troops as they marched on Rome.

1. Arezzo December 2, 1943
2. Ventemigglia December 23, 1943
3. Pisa December 24, 1943, "Piss poor mission, no bombs dropped."
4. Pisa December 25. 1943, "What a life."
5. Orvieto December 28, 1943, "Got air medal today."
6. Weather Ship December 30, 1943, "Peaceful."
7. Weather Ship December 31, 1943
8. Roccasecca January 3, 1944
9. Bucine January 8, 1944, "Didn't find it."
10. Orvieto January 15, 1944, "Roughest raid yet. Plenty of flak and attacked by fighters. What a day."
11. Vitterbo January 19, 1944, "Milk run—no flak, no fighters."
12. Velletri January 22, 1944, "Saw invasion of Rome today. Sure looked good. No flak, no fighters."
13. Tebni January 25, 1944, "No flak, no fighters. Sky overcast. Bombed wrong town—went for the moon and hit a star—train full of airplane parts.
14. Ariccia Date not noted, "Weather bad. Couldn't see target—chased home by four ME's.
15. Perugia Date not noted, "Went up to 15,000 feet today, sure was tired. Had to navigate back alone. Made it with all hands well. Missed target, clouds in our way—FLAK all around us, we were hit in the left tire."
16. Vitterbo Date not noted.
17. Anzio Date not noted, "Beachhead."
18. Rome Date not noted, "Ostiante."
19. Rome Date not noted, "Turbinteria."

20. Viareggio Date not noted.
21. Cassino area March 15, 1944, "North of Aquino."
22. Poggibonsi March 22, 1944
23. North Orvieto March 25, 1944
24. Arezzo March 26, 1944
25. Arezzo Date not noted.
26. Bucine April 19, 1944
27. Bucine Date not noted.
28. Imeisa April 20, 1944, "Flat railway cars to left of bridge, got them just fine."
29. San Giasini Date not noted, "Flak all around us—got north bridge."
30. Poggibonsi Date not noted, "Milk run."
31. Grezzava May 19, 1944, "Biggest bridge yet—1000 feet long, got it. No flak."
32. Vitterbo May 26, 1944, "Went here to trap Hermann Goering Division, did good job,"
33. West of Florence May 27, 1944, "Got bridge, no flak."
34. Termi May 31, 1944, "No flak—missed."
35. Not noted June 1, 1944, "Jerry ammo bombed with just seven ships—getting flak."
36. Ficulle June 4, 1944, "Milk run but had engine trouble."
37. Mauri June 6, 1944, "Day of the invasion—was a milk run.
38. Roccastarda June 9, 1944, "Milk run."
39. Perugia June 12, 1944, "Milk run—really hit the bridge."
40. Pisa June 16, 1944, "Took off in the dark, bombed just at dawn—got the bridge. No flak, no fighters."
41. Sollignano June 22, 1944, "Milk run."
42. Maneglia June 29, 1944, "Milk run, got the bridge."
43. Savona July 3, 1944, "Sure had fireworks today—flak."
44. Collelecchio July 7, 1944, "Oil dump. Milk run."
45. Guastella July 13, 1944, "Platoon bridge. Milk run,"
46. Piave July 16, 1944, "R.R. and RD. bridge—milk run."
47. Casale Montferrato July 25, 1944, "Clouds. Milk run."
48. Gillette* August 2, 1944, "Milk run."
49. Les Cheuire* August 7, 1944
50. Alexandria August 8, 1944, "Milk run."
51. La Croix* August 12, 1944
52. Toulon* August 13, 1944, "Very rough—too much flak."
53. Baie de Cavalaire* August 15, 1944, "Day of southern France invasion."
54. Cerles sur Rhone* August 16, 1944
55. Embau* August 19, 1944
56. Montpelier* Date not noted, "Milk run."
57. St. Donna August 27, 1944, "Saw Venice today. Milk run.

58. Legnano	August 31, 1944, “Milk run—flak below us.”
59. Galliate	September 5, 1944, “Railroad bridge.”
60. Sassuolo	September 9, 1944, “RR bridge west of Bologna. Milk run.”
61. Castel San Pietro	September 10, 1944, “Milk run.”
62. Oggiolli	September 13, 1944, “Troop concentration. No flak.”
63. Oggiolli	September 14, 1944, “Troop concentration. No flak.”

Appendix B: Pilotless Bombers

After the end of World War II, U.S. Army and Navy engineers developed several home-grown versions of the German V-1 flying bomb. By 1949, a shoulder-winged, jet-propelled improvement began tests at White Sands. The TM-61 "Matador" could carry its W5 nuclear warhead (a modified Mark 5 bomb) six hundred miles in little more than an hour.

Technicians experimented with several Matador guidance platforms before settling on a ground-based radar system (the MSQ-1) in the late 1950's. The missiles were not very accurate, promising impact no closer than a mile from targets at maximum range. At the time, given the blast radius of a W-5 warhead, that was considered adequate. Beginning in 1953, more than a thousand of these pilotless aircraft were produced. Detachments were deployed to Germany, Taiwan, and Korea. The last Matador units were deactivated in 1962.

At about the same time, the Navy developed their own pilotless, radar guided bomber—the Regulus—which they planned to fire from surfaced, specially equipped submarines. Regulus and Matador shared the same engine, had roughly the same range with similar accuracies, and carried the same warhead. Each had advantages, but the products of both efforts were closely analogous—the result of inter-service rivalry that continues to sap productivity from U.S. military weapons programs even to this day.

In the end, five hundred Regulus missiles were built before production ceased in 1959. Five submarines (*Gato, Balao, Grayback, Growler,* and *Halibut*) were armed with them. *Growler* and *Halibut*, built specifically as Regulus launchers, could hold five—the others, two each. Two Essex-class aircraft carriers (*Essex* and *Randolph*) were deployed with Regulus missiles on board. In addition, four Baltimore-class cruisers (*Los Angeles, Macon, Toledo*, and

Helena) patrolled the Pacific with three missiles each between 1955 and 1959. All missiles were removed from service in 1964.

A V-1's straight-cut plywood wings spanned less than eighteen feet. Snark, its largest direct descendant, had a forty-two-foot wingspan and was sixty-seven feet long. In the works since the end of World War II, the SM-62 Snark program came to fruition just as U.S. ballistic missiles had begun to show promise. Nevertheless, it was allowed to proceed. The large pilotless bomber had a range of more than five thousand miles, carrying its four megaton W39 warhead at speeds above six hundred miles per hour and altitudes above fifty thousand feet. Tests conducted at Cape Canaveral had mixed success. Some connected with the program joked that the Caribbean was "Snark-infested waters."

A major Snark shortcoming was its celestial guidance system, which mechanically took readings from the sun and stars to ascertain position against internal map coordinates—in much the same way a human navigator might check his airplane's course. In the days before accurate, satellite generated maps, errors could and did occur. During a 1956 Cape Canaveral test, an off-course Snark ended its flight in north-eastern Brazil and was not found until 1983. Even using better map data, Snark warheads were not expected to impact much less than four miles from their assigned targets—close enough, it was then thought, for their multi-megaton warheads to have effect.

SAC's 702nd Strategic Missile Wing deployed thirty Snarks at Presque Isle Air Force Base, Maine, in 1959. The missiles were placed on alert status in March 1960. A year later, President Kennedy declared them "obsolete and of marginal military value," and ordered the wing deactivated.

Snark's even larger cousin, Boojum, was also on the drawing boards of Northrop engineers in the '50's. Boojum would have been more than eighty feet long, and weighed one hundred twelve thousand pounds. It would have been a supersonic cruise missile, powered by twin turbojet engines to reach speeds in excess of Mach two, launched from a rocket sled. The delta-winged missile's range was to be more than two thousand miles, most of it flown at an altitude of seventy thousand feet. Boojum would have shared the celestial guidance system used for Snark—so it wouldn't have been very accurate. Still, it would have carried a large warhead, so pinpoint accuracy was not a design requirement. Eventually written off as too ambitious, the project was shelved before any prototypes were built.

Martin's TM-76 Mace outlasted all other U.S.-developed V-1 descendants. Testing began of an extensively redesigned Matador follow-on in 1954. Mace was faster than its predecessor and carried a thermonuclear warhead. The new pilotless bomber's major advance over its predecessors was its guidance. It was steered by Goodyear's ATRAN (Automatic Terrain Recognition and Navigation)—a system that compared images from a scanning radar antenna to thirty-five-millimeter filmed maps carried within the mechanism. Any deviation from the missile's planned route would be noted on the compared images, and course adjustments would be made. ATRAN was jam-proof, since it did not depend on signals from outside information. The clever system had only two shortcomings:

- Flight over long distances where terrain did not alter—like large bodies of water or deserts—could lead to large course deviations.
- ATRAN could only be as accurate as the map images it relied on. During the mid-1950's, when flight testing began, the precision of available maps was spotty. As time went on and satellite reconnaissance methods matured, this became less of a problem.

Two Mace versions were developed: “A” was launched from mobile transporter-erector vehicles, while “B” was designed for launch from fixed, hardened sites. Both had the same external dimensions, but “B” versions were equipped with a more recently developed inertial guidance system. Inertial guidance used banks of transistorized accelerometers (basically, single-axis gyroscopes) to precisely measure movement from a set launch location to a preset target location. Like ATRAN, inertial guidance systems were virtually jam-proof and extremely accurate. Most subsequently fielded guided missiles would use them.

Six TM-76A-equipped squadrons replaced Matadors in West Germany, between 1959 and 1961. Sixty more missiles were deployed to South Korea in 1959. These were phased out in 1961, replaced by “B” missiles emplaced in semi-hardened Okinawa sites. The last Mace squadrons were taken offline in Europe, eight years later.

Smarter, improved weapons have long since replaced the Mace and its predecessors. Still, cruise missiles now in service with the Navy and Air Force owe much of the technology that went into their guidance systems and other components to these forerunners.

One more ambitious, dangerous unmanned bomber needs to be considered here. Project Pluto was under development between 1957 and 1964. The design called for a nuclear ramjet powered pilotless aircraft with a range of more than ten thousand miles. This was to be SLAM (Supersonic Low Altitude Missile)—a robotic bomber that could carry sixteen nuclear weapons within its bays. As envisioned, SLAMs would orbit at failsafe points over ocean until released, then dive to low altitude at supersonic speed to commence their bomb runs. After its bomb bays were empty, a SLAM could cruise over enemy populations for weeks, causing secondary damage from radiation released by its nuclear ramjet.

Pluto motors were successfully tested, beginning in 1961. A nuclear ramjet mounted on a railroad car ran for a few seconds that year. Three years later, an improved version ran at full power for more than five minutes—full proof of concept. Even so, Pentagon overseers were having second thoughts. They worried that such a system would force the Soviets to develop similar weapons. Besides, intercontinental ballistic missile (ICBM) development was fast providing a reliable, more accurate, and less costly alternative to Pluto. After more than seven years of effort, as well as important advances in nuclear propulsion, the project was cancelled in 1964.

Whether they looked up the old Pluto plans or came up with an analogous concept of their own, the Russians have recently announced an eerily similar weapon under development. Called *Burevestnik* (Petrel), their new missile is described as "a sub-sonic nuclear-powered cruise missile system which has global reach and would allow attack from unexpected directions," per UK chief of Defence Intelligence (CDI) James Hockenhill. Reportedly thirty-nine feet in length, the missile's ramjet engine will produce radioactive exhaust "throughout its entire operation," according to *Izvestia* military writer Anton Lavrov.

Sounds a lot like Pluto, at least from the information that's been released. Tests of *Burevestnik*'s powerplant have apparently not been without problems. In 2019, the Russian nuclear energy agency Rosatom confirmed leaking radiation from the test of an "isotope power source for a liquid fuel engine." Five Russian scientists were killed during the accident that caused the leak. Several outside observers have voiced suspicion that the incident was related to the *Burevestnik* program. Additional reports have pointed to an August 2020 incident labeled "Skyfall" by the press—in which "a nuclear reaction occurred during the attempted recovery of a

Russian nuclear-powered cruise missile that remained on the bed of the White Sea since its failed test early last year."

Should the Russians persevere in their development, perhaps a Pluto descendant will threaten the world's skies after all.

Appendix C: The Thor Intermediate Range Ballistic Missile

Thor was the nation's first long-range ballistic missile, the frantic work of a nation shocked by Sputnik. Developed in the fear that the U.S.S.R. would deploy their rockets before a U.S. counterpart was operational, Thor was designed to have an operational range of fifteen hundred miles—enough to reach Soviet targets from planned European launch sites. The missile was a stop-gap, destined for replacement as soon as longer-range Atlas and Titan weapons were ready. Thor carried a W49 thermonuclear warhead with a yield of over a megaton. It was propelled by a Rocketdyne LR-79 motor, which provided more than one hundred fifty thousand pounds of thrust using kerosene as fuel and a liquid oxygen oxidizer. The motor had originally been developed for the now-defunct Navajo missile project. It was, at the time, the only tested engine choice available.

As was too often the case with military weapons projects of the era, Thor was in competition with the Army's Jupiter program. Both missiles used the same engine, had the same range, and carried the same warhead. Jupiter had been developed by Chrysler Corporation, in close collaboration with Werner von Braun's scientists at the Army's Redstone Arsenal. It had originally been designed as a submarine-launched missile, cast from that role when the Navy developed a far safer solid fueled alternative for the purpose. Jupiter then received Army support in a land-based intermediate range missile debate.

Though Thor testing began earlier, Jupiter tests were more successful—primarily due to the care and pretesting they received from von Braun's team. In a frenzy of vacillation, Defense Secretary Charles Wilson decided both missiles should be deployed, as his last ruling before leaving office in late 1957. Even so, Jupiter was never put in service. The Italian and Turkish bases planned for the missile were cancelled as part of the agreement that ended the 1962 Cuban

Missile Crisis. Thor survived, because the British still wanted their squadrons, and because Thor—unlike Jupiter—was designed to fit nicely in the hold of a C-124, the largest Air Force transport aircraft of the time. The Thor versus Jupiter debate stands as just another example of time, effort, and money wasted through needless inter-service rivalry.

British RAF launches began in December 1959. All twenty British Thor squadrons were in place and activated by the end of 1959, with sixty missiles in place in their semi-hardened shelters. They would remain in place until their deactivation, four years later.

Thor lived on, long after the British need for them had ended:

- Thor missiles carried the nuclear warheads used in the *Bluegill*, *Starfish*, and *Kingfish* tests launched from Johnston Island, in the Pacific. These tests—when they succeeded—set off nuclear weapons above the earth's atmosphere to test their effects, and to attempt the creation of a new magnetic field around the Earth. *Starfish Prime*, which detonated two hundred fifty miles above the earth's surface in July 1962, created noticeable electro-magnetic pulse effects as far away as the Hawaiian Islands.
- Under Program 437, several Thor missiles modified as "thrust augmented Delta launchers" were kept as anti-satellite interceptors until 1975, when they were retired.
- Renamed "Delta," Thor missiles still fly, launching satellites for various military and civilian programs.

Designed in great hurry, buffeted by internecine competition, and plagued by early test failures, Thor has outlasted its contemporaries and still works today.

END OF BOOK