

MX

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FOREWORD

This work is fiction. Any resemblance of characters portrayed in this book to real persons is strictly coincidental. In some cases, actual places and public institutions have been used for realism. In such cases, any resemblance to characters portrayed in such places and institutions to real persons is strictly coincidental. All descriptive material relating to US military defensive or offensive strategies, installation layouts, or procedures is strictly hypothetical, and is not intended to resemble any actual military strategy, installation layout, or procedure.

I. ARIZONA SUNSET

The battle was over. The hot afternoon sun beamed down on the dead and dying. In the cloudless sky overhead, buzzards circled lower and lower, in mute testimony to the carnage in the desert below. On the ground, little moved in the hot, still afternoon, save for the scurrying of an occasional scorpion and the cautious attempt by two roadrunners to reclaim the territory from which they had been abruptly displaced by the furious activities of two hours ago.

The fighting had been quick and decisive. Soaring Eagle's braves had been no match for the cavalry unit that had struck them. They had been vastly outnumbered, and their arms -- more bows than rifles -- were of little avail against the superior firepower of the enemy. Courageous though it may have been, the stand against the cavalry unit was but one more futile attempt to slow the relentless advance of the white man over the Indians' lands.

Soaring Eagle lay unconscious on the ground where he had fallen. He had been shot in the belly as he rode toward the attackers. In the fall from his horse, his head had struck the ground, rendering him instantly unconscious. Lying face up, gut-shot, head bleeding, he had been assumed dead or left for dead - there having been little question of his eventual fate in either case.

As he gradually regained consciousness, he sensed the burning pain in his side. Semiconscious, his mind was a fuzzy blur. He sensed that something was wrong, and his mind attempted to focus on the hurt in his belly. He moved slightly, and groaned at the jabbing pain that resulted. Slowly, gradually, he fought his way back to consciousness. He remembered the battle. He opened his eyes. The bright light hurt, and he closed

them again. He moved his hand down to his stomach, and felt the torn, bloody wound. His mind sickened in the knowledge that, gut-shot, he was doomed.

He lay there motionless for several minutes, his head still reeling, as he collected his thoughts. The battle was evidently over, he realized, the outcome apparent. The sun beamed down relentlessly on him; he was feverishly hot, and his throat was dry. He longed for water to slake his thirst, but he knew that none was to be had. Opening his eyes again, he turned his head to the left and then to the right to see where he was. Twenty meters to his right was a large boulder, shaded on the east side from the afternoon sun. He would crawl to the shade of the boulder.

As he started to move, he recoiled from a jab of pain in his stomach. He decided to stay where he was, but the pain gradually lessened, and he started again to crawl to the rock. After several resting spells he reached his destination, and lay in the relative cool of the rock's shade.

He knew that he was a dead man, and his thoughts turned to making peace with his maker. Feverish, weakened from his wounds and loss of blood, and exhausted from exposure to the hot sun and the crawl to the rock, his mind floated between consciousness and unconsciousness in the panorama of dreams of a dying man.

It was late in the afternoon when Daughter of the Moon and the other squaws and young boys reached the site of the battle. One by one, they found their husbands, fathers and sons. Most of the men of the village had been in the party, and none of the squaws was spared the grief of a lost husband or son.

Because the fighting had been extensive, it was some time before all of the warriors were located. Soaring Eagle was among the last to be found. Daughter of the Moon searched frantically for him among the dead. Was he here, or had he been taken captive, to be hanged by the long knives? She prayed that each

brave they found was not hers, and yet she prayed that he was not captured either.

Finally, she found him, lying beside the large boulder. She rushed to him, and placed her ear to his chest. He lived! His life had been spared! Her joy at finding him alive was quickly quashed, however, at her realization that his wound was almost surely a mortal one. She clasped her arms around his unconscious body and, her face on his chest, broke down, first in tears, then soft moans, and then uncontrollable sobs.

She allowed her emotions only a brief release, however, for she knew she must get him back to the village. The available horses were few, and the others were using them to carry their dead to the burial ground. She needed a horse and travois to carry her husband back. She stood up and looked for her son, Night Hawk. Seeing him several hundred meters away, she called for him to come, that she had found his father.

Night Hawk raced to his mother, and, though she tried to restrain him, he was not to be comforted. Still a young boy, he had not yet learned the stoicism of the older men of the tribe.

"You must follow the other women to the burial ground, and bring back a horse and travois," she instructed him. "Hurry! It is almost nightfall. We cannot wait until morning, or your father will die. I will wait here with him until you return. Now go!"

Night Hawk took a last look at his father, and turned in the direction of the burial ground. He jogged slowly, since he knew that he would soon overtake the mourners on their way to the holy place.

Daughter of the Moon turned back to her husband. She dampened a cloth with water from the waterskin she had with her, and cleaned the wounds on her husband's head and abdomen. The cool water on his head roused him to consciousness, and he looked at his wife sitting next to him. His heart swelled that she should be with him in his last his last hours. He struggled to raise himself, but she urged him to be still.

"The others...," he asked, looking back in the direction of the main battle area.

Daughter of the Moon lowered her head and closed her eyes. He knew what her answer was.

"We cannot drive the long knives from our lands," he whispered, his voice hoarse and weak. They multiply like rabbits, and cover our land. Their warriors are many, and are not to be repelled." He paused, taking a series of short, shallow breaths.

"Rest, my husband. Night Hawk has gone for a horse," she comforted.

"I need no horse, for I am finished...."

"Do not talk, husband, you need to rest," she interrupted.

"No, wait, I must speak. Do not sorrow for our lost battle. For the Great Spirit appeared to me in my dreams, and has told me that we shall one day take our lands back from the white man. The Spirit will rain fire on the white man, and destroy all his villages. Our people will once again occupy the land which has been taken from us," he whispered, now gasping for breath, but unable to breathe deeply.

"Rest, husband," she urged, paying little attention to his words, alarmed at his loss of strength from speaking.

Having spoken his piece, he closed his eyes and slipped into unconsciousness once more. Holding his hand, Daughter of the Moon waited anxiously for Night Hawk's return. Darkness had fallen, and stars covered the sky. A blood-red full moon was rising in the east. In the distance, she could hear coyotes howling their mournful calls.

[Abridgement 1.]

II. BOOM TOWN

First Verse:

In eighteen hundred and sixty one
Work on the railroad had just begun
Work on the railroad had just begun
Working on the railroad

Chorus:

Patsy atsy orey ay
Patsy atsy orey ay
Patsy atsy orey ay
Working on the railroad

Workers' song, sung during construction
of the Union Pacific Railroad

Buzzard Flats, near the Arizona / Utah / New Mexico border...

Cal leaned a little further back in his chair. He was sitting on the front porch in his rocking chair, relaxing in the warm afternoon sun. From the rise on which the house was located, Cal could see off in the distance for kilometers. To his right, several kilometers away, he could see the taller buildings of the small town – village, actually – of Buzzard Flats. To his left, he could see the oilrig, pumping up and down at a slow tempo that matched the lazy afternoon.

Cal reached over and picked up his guitar. He looked down at his two dogs, Rover and Sport, lying at his feet.

“What would you like to hear, Sport?” he addressed the closer of the two dogs, in a conversation that was destined to be decidedly one-sided. Upon hearing his name, the dog raised his head and looked at his master, but realizing that he was to receive no further instructions, he laid his head back on the porch floor. “How about *Ghost Riders*? Naw, that’s too fast. Or maybe *Streets of Laredo*? Or how about *Cool Water*? Yeah, that’s it. *Cool Water*. Just right for a hot afternoon.

Cal strummed away on the beat-up steel-string guitar, singing every verse of the old-west ballad. As he sang, Rover rolled over on his back, in a futile attempt to get cooler in the hot afternoon. When Cal finished, he placed the guitar back on the low table beside him, and picked up his soft drink.

“Hey, Cassie,” he called to his wife, who was working in the kitchen. “When are we going to eat?” A few moments later, Cassie appeared at the screen door.

“What do you want, Cal? The water was running and I couldn’t hear you,” she said, talking through the door so as not to let any flies in.

“I wondered when we were going to eat,” he repeated. “I missed lunch while I was out today, and I’m starved.”

“Now Cal,” she answered, in a slightly scolding tone. “Supper won’t be ready for another hour or so. I’ve just put the beans on. Why don’t you read the paper?” she suggested.

“The mail’s late. I wonder what the problem is? Damn postal service. Seems every year they get worse. Only twice-a-week delivery service now. Before you know it, they’ll go back to general delivery, and drop rural delivery altogether.”

Just then, off in the distance, Cal spotted the trail of dust that in all likelihood meant the mail truck was coming. A few moments later, Sport raised his head and picked up his ears. The delivery box was open, and Cal had trained his two dogs to retrieve the mail.

As the truck drew nearer, he saw that it was indeed the mail truck, and he spoke to his dogs. “Go to it!” he urged, pointing to the truck.

It was no day for running, but the two dogs took off down the lane toward the mailbox. Cal leaned back farther in his chair, and placed his cowboy boots on the porch railing, crossing them as he crossed his hands behind his head. He smiled as he saw Sport reach the box first, as he usually did. The two dogs reached the

box before the truck, and waited as the mail was placed inside. The dogs retrieved it, and trotted back up the lane to the porch.

Cal took the mail from the dogs, and patted them on their backs. "Good dogs," he praised. Panting, they resumed their prone positions on the porch floor, in the shade of the large pots that rested near the steps.

The mail was about the same as ever. Two Federal Registers, two Commerce Business Dailies, a Time Magazine, two issues of the Wall Street Journal, and the local paper. As he decided which to read first, Cassie opened the screen door and stepped outside onto the porch. She had finished preparing the food, and was going to rest while it cooked.

"Whew!" she exclaimed. "It sure gets hot in there when I start to cook."

Since the magazine and the Journal were already several days old, Cal settled on the local paper first. He opened it up and glanced at the headlines. He was electrified by what he saw.

"Hot diggity damn!" he exclaimed, in his West-Texas drawl. "Hot damn!" he exclaimed again, sitting up on the edge of his chair.

Cassie dropped her needlepoint to her lap, and looked over at him. "What is it, Cal? What's going on?"

"Hot damn!" he exclaimed a third time. "The MX is coming to Buzzard Flats."

"The MX? What's the MX?" Cassie asked.

"The Maginot Line, Extended," he joked, never missing for a moment an opportunity to kid. "Seriously, haven't you heard? MX... Missile Experimental... the MX ballistic missile system! The system of intercontinental ballistic missiles that's going to be built all over the Southwest. You know, the system that has the big circular railroad tracks." Cal could see from her look that she evidently had not heard of the system, and he continued. "All along the tracks are missile sites, but only some of the sites contain missiles. A train keeps moving the missiles from site to

site, so that the Russians don't know which sites contain missiles. And there are so many sites that if they attacked us, they couldn't destroy them all."

"But Cal, won't they see the train move the missiles, from their spy-in-the-sky satellites?"

"No, no. The train is always carrying something – either a 'dummy' missile or a real one. So even though they see it, they don't know when a real missile is being moved."

"So it's coming to Buzzard Flats," she asked. "What difference does that make?"

"What difference does it make? What difference does it make?" he repeated. "It means we've struck it rich. It's bigger than the Alaska pipeline. It'll cost billions! It's like paving the streets or Buzzard Flats with gold!"

"But Cal. They'll hire a big construction company to do all the work. How's it going to help us?"

"Men, honey, men! The workers on the line. With tons of money to spend and nowhere to spend it. After working all day in the hot sun, they'll want some rest, relaxation, and entertainment. Wine, women, and song! A cold beer, a good meal, a friendly poker game, and – most of all – female companionship!"

"Oh, Cal!" Cassie commented, disapprovingly.

"We'll do it all! I can see it now!" he swept his arms across the horizon in the direction of Buzzard Flats. "The Golden Nugget Café... the Silver Dollar Saloon... the Paradise Lounge and Motel... we'll have a chain of them, near every MX site! A complete, integrated service system – we'll serve the worker from the time he hits town till he stumbles back to work in the morning."

"But Cal," Cassie continued with her skepticism – Cal was obviously off on another of his hare-brained schemes and she was playing the devil's advocate – "won't he just eat at the construction site?"

"Hey-ell no," he retorted, in his drawl. "For one thing, the food won't be any good. More importantly, they won't allow women on

the site. We'll have such a large covey of girls that he won't be able to stay away."

"But Cal," she continued, "prostitution is illegal in Arizona."

"Honey, the citizens of the state will love us for what we're doing. They know that on any project like this, it's either hookers or their daughters who provide female services to the men. You know – just like around any military base. They know that any twenty-one-year-old stud is *going* to have some fun, one way or the other. Hell, if we didn't provide the girls, the local church ladies' group probably would – without talking about it, to be sure. Anything to protect their daughters. No there won't be the least resistance on the matter of girls," he concluded. "Anyway, prostitution's legal in Nevada."

"What about Utah, Cal? You know how religious those Mormons are," Cassie asked, still skeptical.

"Hell, Utah will be our biggest state. To keep the workers off their daughters, they'll pass a one-day automatically expiring marriage law, if they have to. You just don't realize the social impact of injecting thousands of hungry males into conservative-rural areas. Besides, prostitution is always biggest where religion is strong. The only way you can keep a girl a virgin is to have plenty of whores around for the sons. There's no way the LDS church is going to allow tens of thousands of raving sex maniacs to be turned loose on their flock."

"I guess you're right, Cal," Cassie agreed.

"Money – the men will be itching to spend it. These construction projects in remote areas pay fabulously well. Common laborers on the Alaska pipeline were making twenty and thirty thousand dollars a year, with no place to spend it. We'll set up the world's largest auto/truck distributorship. We'll sell them pickup trucks, sports cars, recreational vehicles, motorcycles, airplanes – the whole bit." Cal sat back in his chair, drunk with his vision of things to come.

“I can see it all – we’ll sell them everything. MX Drugs – a full-service drug/department store. We can even have our own labels – MX Beer... MX Cigars... MX Chewing Tobacco... MX Cola. We’ll need a holding company – MX Industries, Limited.”

“Oh, Cal, you’re being silly!” Cassie laughed.

“The hell I am!” he protested. “What I’ve mentioned is just the tip of the iceberg. I haven’t been reading all those Commerce Business Dailies (CBDs) and Federal Registers all these years for nothing. The Federal Register tells all about the federal giveaway programs – grants – and the CBD advertises all the federal contracts. For every dollar we rake in from the private sector, we’ll make three or four more from Uncle Sam. To begin with, the federal government will finance the whole deal. Because of the boom/bust impact of the project on nearby towns, no respectable bank will take a mortgage on the buildings we’ll put up. So we’ll qualify for a Small Business Administration (SBA) loan. Next, the government has a rule that all large contractors have to spend ten percent of large contracts on small business subcontractors. As a local firm, we’ll get the state legislature to make sure we get our ‘fair share.’ That’s ten percent, right off the top.”

“Gosh, Cal, it does sound like there will be some good opportunities developing.”

“Good god, you haven’t seen anything yet. Every federal agency has research and evaluation funds for projects that relate to the impact of the MX project. For example, we’ll get a grant from the Economic Development Administration to study boom towns, a grant from the Department of Education to set up bilingual education programs for the workers’ kids, a grant from the Equal Employment Opportunity Commission to study employment of minorities on the MX construction project, a grant from the Department of Transportation to investigate alternative uses of the MX railroad after the system becomes obsolete in a few years, a grant from the Department of Agriculture to study the impact of the developed infrastructure on farming...”

“Hold on, Cal,” Cassie protested. “Things can’t be as rosy as you paint them.”

“Oh yeah? There’s a law that says all these programs have to spend one percent of their budgets on evaluation – that’s in addition to the countless millions they spend on research. Furthermore, they actually have to *give* much of the money away, in the form of grants, whenever the primary recipient of the work is a group other than the government itself – they can’t even let competitive contracts for it!”

“Did you read all this in the Federal Register, Cal?” Cassie was struck by his wide knowledge of federal programs, and his evident conviction.

“You know it. The government publishes everything that’s going on in the Federal Register.”

“But what happens when the MX system is finished, and everyone leaves? We’ll be right back where we started.”

“The hell we will!” Cal retorted. “The gravy train’ll have just begun. When the project is under way, all sorts of social problems will emerge, and we’ll set up firms – ‘providers,’ they call them – to address those problems. The Public Health Service funds Alcoholism Treatment Centers, Mental Health Centers, Maternal and Infant Care Centers, Migrant Workers’ Centers, Community Health Centers, and Family Planning Centers. We’ll provide ‘free’ transportation (paid for by Uncle Sam, of course) as part of an outreach program to get the workers to our centers – by the way, our auto firms can sell transportation vans to the providers. We can operate all these centers while the MX project is under way. Then, when it’s over, a whole new set of social problems will arise – and a whole new set of federal programs will take over, when the income levels of the people left behind drop. For example, the social services programs will pay for providers to provide alcohol and drug abuse counseling, services to unwed mothers, adoption services, and interpersonal relations counseling. The Department of Labor will fund training centers

and job referral centers for the unemployed. Our day care centers will care for children while the women are in training. We can then hire the women back to run the centers. The Department of Agriculture will need a distribution agent for its Food Stamp and Women and Infant Children programs. The..."

"Okay, Cal, okay. I see what you mean. But one man can't do all that. No way," Cassie observed.

"You're right. We've got to pull the family back together in order to take full advantage of this gold mine. Let's see. I have to call Ralph – he's got an MBA from the Harvard Business School – and Harry – his degree in law is from the University of Pennsylvania – and then there's Roger – he's running a small bank in Waco – and Dan – he's conducting social research projects at UCLA – and..."

"Okay, Cal, dinner's ready." Cassie rolled her eyes, as she got up and went inside to serve their dinner. Cal was obviously off on another major project. Last year it was a high-efficiency external combustion engine, and the year before that a commodity mutual fund. From the oil well, they had a comfortable source of income, and they could certainly afford the investment of time, effort, and limited dollars. But all those giveaway programs he was talking about had nothing to do with the government. Oh, well, she reflected, better having him spending time on another hare-brained scheme such as this than chasing women down at the local saloon. And it might just pay off – millions had been made from crazier ideas. As she poured his glass of tea, she heard him on the telephone in the other room.

"Hello, Ralph? Cal here. How're you doing these days? Hey, that's great! Say, Ralph, I've got this great business opportunity opening up, and I knew you'd be interested..."

"Cal...Cal! Dinner's served," Cassie called. But she knew he didn't hear her, and she sat down to the first in the beginning of a new series of late or missed suppers.

Late in the evening, just before turning in, Cal and Cassie were sitting on the porch. Cal had his feet propped up on the porch railing.

“Are you tired, Cal?” Cassie asked.

“No, just thinking,” he replied. He reached for his guitar.

“Call,” Cassie began, “you’ve said a lot about how the MX will help the local economy, but what about its original purpose? Will it work? Will it protect us from the Russians?”

“Hell no, it won’t work! Doesn’t have a ghost of a chance. It’s too ‘soft’ – the Russians can easily blow the sites to bits. Also there are far cheaper ways of achieving a better second-strike capability. You know, don’t you, that even if the MX works the way it’s supposed to, it doesn’t really ‘protect’ us. The whole point to the system is to make sure that we have enough missiles left to blow the Russians to bits, if they attack us first.”

“You mean that it doesn’t protect us at all if the Russians actually decide to attack?”

“No way – it’s a ‘deterrence’ system, not a defense system. All we get for our hundred billion dollars is the satisfaction of blowing those dog-damned commie bastards off the map, after they blow us off the map – posthumous gratification, you might call it. Hmmm... now that I think about it, that might not be such a bad idea after all.”

“Gosh, Cal, that seems like an awful lot of money to spend just for revenge, if we’re dead anyway.”

“Damn straight! That’s why I don’t mind cashing in on it – making a little jack. One good boondoggle deserves another, I say.”

As they talked, Cal had been strumming a few chords on his guitar. “You know, I’ve got a great idea for a song. Listen to this.” He sat up on the edge of his chair, both feet on the floor. He began strumming his guitar, and, to the tune of *The Rock Island Line*, sung:

“Well, the MX Line is a might good road,

The MX Line is the road to ride,
It don't carry cattle and it don't carry coal,
But we don't mind, 'cause it's lined with gold."

"Oh, Cal," Cassie laughed. His good humor was contagious. At times, he was so funny. As he started the second verse, Sport rose to his feet and walked over to Cal's chair, and started to howl, evidently at a coyote in the distance, but seemingly in concert with Cal. The scene was a riot – Cal singing *The MX Line*, tapping his foot on the porch in tune with the music, Sport howling. This should be an interesting year.

When he finished singing, Cal chuckled to himself, and placed his guitar back on the table. "Hot damn!" he exclaimed, slapping his knee. "Now, where did I put those federal grant application forms?"

III. THE FASTEST GUN IN THE WEST

The Sun and the Eagle as victors shall appear
A vain response to the vanquished shall be assured
Armaments shall increase
Peace shall be achieved by threat of Destruction

Nostradamus I:38

A weapons proving ground in southwestern United States...

"Mr. President, I believe you'll be very impressed by our demonstration today," General Smith began. "This operational test of the laser array represents the culmination of a concentrated ten-year program to develop an electromagnetic radiation (EMR) beam of sufficient power to destroy enemy missiles."

“I’m looking forward to the demonstration, General,” the President replied. “For years, the possibility of developing a ‘death ray’ laser was dismissed as extremely remote. Could you review for me how you accomplished this seemingly impossible task?”

“Well, Mr. President, there were numerous difficulties to be overcome, but there were two major ones: *aiming* – which consists of positioning, steering, and tracking – and *power*. First – and this was the major problem – was the difficulty in aiming the laser beam at a fixed point. Even if we knew exactly where we wanted to aim it, background vibration caused the beam to jiggle slightly. Over short distances, this presented no problem, but over distances of hundreds of kilometers, the beam scanned an area of a meter or more. The intense energy of the laser beam can cause little damage, however, unless it is concentrated on a point, or at least a very small area. If a laser beam rapidly scans a large area, it is no more harmful than a beam of noncoherent light of the same power shining on the same area. For example, aimed at a diamond at close range, a relatively low-power laser beam can cut through it in just a few microseconds. Aimed at the moon, however, the same laser beam would –until now – scan an area of several square kilometers, totally dissipating the incredible destructive force of the beam that is so apparent if it is concentrated on a single point. So spread out, the beam would now be no more destructive than a comparably-powered searchlight aimed at the moon from a few kilometers above its surface.”

“Well, how did you solve the aiming problem?” the President asked.

“Through three related developments. First, we perfected the scanning maser interference radar, which could measure the position of incoming reentry vehicles (RVs) to accuracies of one part in a million. For example, we could pinpoint an RV five hundred kilometers away to an accuracy of less than one-half

meter. Such high accuracies are not at all necessary for search/detection radars, or even for crude tracking radars such as those used to support a missile-based anti-ballistic missile system. They are absolutely essential, however, for the high-precision tracking required to place a laser beam on target.”

The General paused for a moment to clear his throat, and continued. “As the second of the three related developments, we perfected an electronic beam steering mechanism, or ESM, which enabled us to place the laser beam right on the target. A mechanical steerer simply cannot steer a laser beam at long distance. Even when it is carefully aimed on a stationary target, it may miss the target by tens of meters. Also, it simply cannot move in the essentially ‘continuous’ fashion required to track a fast-moving object at long distance. With the ESM, the laser beam can be placed right on the RV and kept on it, even though it is moving at high speed. The ESM is so sensitive, in fact, that it can be used to compensate for the ‘jiggle’ associated with background vibration and atmospheric interference as well. To summarize, with our high-precision radar, we know exactly where an RV is, and with our ESM, we can place the beam right on target,” the General explained.

“I thought that vibrations and atmospheric interference were essentially random,” stated the President. “How does the electronic beam steering mechanism overcome these problems,” the President asked.

“Well, Mr. President, that brings us to the third development – tracking. As long as digital tracking systems were used, at sampling rates that did not saturate the processing capabilities of the tracking computers, the vibrations, refractions, and interference *did* appear essentially random. With the perfection of the analog continuous-feedback tracker, however, the random component of the jiggle was reduced dramatically. That is, the level of the noise in the system was substantially reduced. In effect, the analog tracker enabled the beam steerer to

compensate for the jiggle and for much of the refractive and frequency distortions of the atmosphere. About the only noise that remains follows from the fact that there is a slight delay from the time that the beam leaves the ground until the reflected signal is received back. The old digital correlation and tracking systems, based on high-compute algorithms such as the Kalman-Bucy filter, are used only for rough positioning of the laser tube in the approximate direction of the income RVs.”

“Well, tell me, why are so many laser guns used in the laser array?” the President asked, pointing in the direction of the array. “Why not just use one big gun?”

“Well, sir, that brings us to the second major problem we faced – power. Actually, there are two reasons for the multiplicity of guns. First, each gun is set at a different frequency, in order to bombard the target with energy across a good portion of the EMR spectrum. By the way, each gun has its own independent analog tracker,” the General added. “Second, although we have made tremendous strides in the development of high-power lasers, the maximum unit we have been able to develop to date is a one-megawatt unit. In order to fuse RVs and vaporize decoys, we need a one-gigawatt beam. Hence, at the current time we have an array of 1024 independent guns, each of one-megawatt power.”

“Do you mean to say that a full gigawatt of power is bombarded on the RV?” the President asked, quite surprised.

“By the time the RV is three-hundred kilometers from here, yes. At that distance, ninety-five percent of the energy of the composite beam is centered in an area of one square decimeter – about the area of an incoming warhead, head on. At farther distances, the cross-section of the beam is, of course, larger,” the General added.

“One gigawatt of power,” the President repeated. “That’s enough power to run a large city. Where do you expect to get the

power to run this machine?” queried the President, his eyebrows raised in skepticism.

“Two sources,” the General responded. “First, we have plans to develop a series of fission reactors, one for each array emplacement. These fission reactors will be replaced by fusion reactors – ‘no-waste,’ or ‘clean’ reactors – as soon as the technology is available on a large-enough scale. For the time being, however, we are planning to use the commercial power grid. Since each array will be located near a major city, the power will be available. We are setting up a system that will shunt all of the city’s power to the array, in the event of an attack.”

“I see. Well, I guess that answers all of my questions. Let’s get on with the test.”

“Well, Mr. President, we have actually arranged for a series of three demonstrations,” the General began.

“A full-length feature presentation,” the President joked.

“Yes, sir,” the General responded. “First, we have set up three one-inch thick plates on a high tower several hundred meters from here. One plate is steel, one ceramic, and one high-melting-point plastic. The array will be beamed at the plates, with sufficient beam movement, or ‘jiggle,’ that the beams scan a one-square-decimeter area on the plates. We will fire the beam at the plates for a mere fraction of a second. You can see what happens, with these field glasses,” he added, handing a set of binoculars to the President. “Okay, Major, begin the countdown.”

The Major began, “Ten, nine, eight... three, two, one, fire!”

As the President watched, he saw what appeared to be an explosion in the center of the plates. Not a sound issued from the laser array before him, but a moment later the loud report caused by the instantly vaporized material reached the platform. When the smoke cleared, he saw a baseball-sized hole in the center of the plates. The President was clearly impressed.

“Good god,” he gasped. “That power’s incredible. I can scarcely believe my eyes. But what about the beam? Doesn’t it

travel on, after it has hit the plates? What if there's an airliner passing by?" he asked.

"Well, in the demonstration you just saw, much of the energy was absorbed in vaporizing the materials. Moreover, since in this test we are jiggling the beams by a great deal, the cross-section of the beam widens rapidly, so that it is essentially harmless by the time it reaches commercial air space," the General explained.

"For the next demonstration, sir, train your glasses on the landing strip to the east of us." The General pointed to their left. "We're going to fire twenty jet drones across our field of vision. They will have expended their fuel by the time they reach us. The drones have been constructed as approximate replicas of several known types of nuclear warheads. Watch what happens as the drones soar past us."

Once again, a countdown was initiated. The drones took off, climbing at a forty-five degree angle into the air to their left. As they passed in front of the observers, all twenty of them disintegrated in violent and fiery explosions. The suddenness of their destruction and the shock of the multiple explosions startled the President. "I thought you said they would be out of fuel," he asked, surprised.

"They were, sir. The explosions you saw were caused by the pressure of vaporized internal components. The devices exploded in a fraction of a second before the metal shells would have vaporized. Note that each drone received only one-twentieth of the total array output," the General remarked.

The President was awed. The sheer power of this device was shocking. "This device is incredible!" he marveled. "General, I'm impressed! But you said that there were to be three demonstrations. What's next?"

"The final test is planned for after dark. Between now and then we'll have dinner, and describe the system in more detail."

It was shortly after nine o'clock in the evening when they reassembled on the observation deck. The President had been briefed on the final test. Fifty ballistic missiles were to be fired simultaneously toward impact points on a circumference of radius twenty miles from the observation deck, from five firing ranges located about eight hundred kilometers away. Each missile would contain ten multiple independently targetable reentry vehicles (MIRVs) and ten balloon "decoy" RVs. After separation of the MIRVs, the cluster of RVs would be surrounded by a large "chaff" cloud consisting of millions of metallic needles. The RVs on the same missile would be cross-targeted to different points on the target circle. The laser array was to destroy all thousand RVs before they came within two hundred kilometers of the test site.

At the appointed time, a countdown was initiated. A set of television monitors had been placed on the observation platform, in order to view the blast-off of the fifty missiles. At zero hour, the sets displayed some of the missiles taking off. A large map screen had been set at the rear of the platform. Each RV was represented by a point of light on the screen.

Within a minute, all of the missiles had disappeared from sight on the television screens.

"Quite an impressive salvo," the President commented, as the last of the missiles disappeared from view.

From a computer monitor, a major continued a description of the progress of one of the missiles. "Missile 37 has just cleared the atmosphere, sir," he reported.

The President glanced into the night sky. He had been briefed on what would happen, but not on what he would see.

"The engine's just been cut on 37, sir. It's in free flight on a ballistic trajectory," he added.

"How fast is the missile going, Major?" the President queried.

"It's going about 30,000 kilometers per hour, sir."

The President glanced at the green computer screen, which depicted the velocity of Missile 37.

“MIRV separation has just occurred,” the major said. “You should be able to get a good picture of what’s happening now on the map screen.”

The President glanced at the large illuminated screen, which displayed a map of the surrounding portion of the southwestern US. The major was right. The points of light were now moving well away from their starting points, and several of them were splitting slightly apart into multiple paths of light, as each MIRV, headed in a slightly different direction.

“In an actual attack, the attacker would probably hit each target with RVs from different missiles. We’ve simulated that here by our firing missiles from several different directions, with RVs aimed at different points on the target circle,” the General explained.

“What about the number of missiles being targeted here?” the President asked. “Is this typical of an actual attack?”

“Fairly typical for a large city,” the General responded, “but not for a military target. For a military target, the enemy would probably send two fairly high-yield warheads, such as two five-megaton warheads, against the target. The main point to our test today is the fact that it is virtually impossible to saturate this defense system, even if a large number of small RVs is deployed.

“I take it that the laser array makes our terminal interceptor missiles obsolete,” the President asked.

“No, not really,” the General replied. “They’re still useful for remote targets that do not have available or justify the installation of a high-power electricity generation plant, and are unlikely to be targeted with a large number of warheads. Even so, laser arrays located near our borders will still be used to ‘burn off’ decoys at a considerable distance so that they do not saturate the point-target trackers.”

“The RVs have passed their zeniths, and are headed down now,” the major reported. The map screen showed that the missiles were about halfway toward their target.

The President watched the map screen. The lines of light were converging rapidly toward the center of the screen.

“Watch the array, sir,” the General nudged the President’s arm, and pointed him toward the laser array before them. The array was well lit up, and the President could see the guns start to move, in concert. For about five seconds, they swiveled quickly and silently back and forth. Then, they stopped.

“Well?” the President asked. “What happened? Why’d it stop? I didn’t see anything.”

The General laughed. “Look at the screen, sir.” The President turned toward the map screen. The map was blank; there were no longer any traces on it. Instantly, the impact of what he was seeing – or rather not seeing – struck him. The test was over. The RVs had all been destroyed.

“Good grief!” he exclaimed. The impact of the demonstration was magnified by the absence of noise and light that contrasted this demonstration with the two earlier ones. “I’ve got to hand it to you, General. You’ve developed what appears to be the ultimate defensive weapon against the threat of the intercontinental ballistic missile (ICBM).”

“Don’t thank me, sir. Credits go to the scientists and engineers of the US military-industrial complex, and to Congress for having the foresight to commit the massive R&D funds which the system development cost.”

“What do you view the impact of this device will be on the balance of power between the US and Russia?” the President asked the General.

“Sir,” the General responded, and then paused, as he weighed the import of the system’s introduction. “Sir, in my estimation the US once again has a ‘first-strike’ capability.”

The Press Secretary interrupted. “What do you mean, General? We could always strike the Russians first. And besides, this is strictly a defensive weapon. What does it have to do with offense?”

The General laughed at the Press Secretary's naïveté regarding strategic nuclear warfare, and explained. "A 'first-strike capability' doesn't mean just that we can strike first. Obviously, anyone can do that. What it means is that, if we *do* strike first, our attack is so devastating, or our defense so effective, that we would receive little or no damage from the enemy's counterattack. We had such a capability in the fifties and early sixties, when the Russian nuclear delivery system was primitive. We could easily destroy them in our first strike, and they could not inflict any significant level of damage on us in return. All that changed, however, when Russia's nuclear capabilities finally caught up with ours. Through the late sixties and seventies, we passed through an era of 'mutual assured destruction' (MAD), or 'mutual deterrence.' Both sides realized that no matter how massive their first strike, the enemy could retaliate with a counterattack of massive destruction. Until now, it was impossible to develop a high-reliability ballistic missile defense. The variety of RVs and penetration aids could outsmart or overwhelm the processing capabilities of virtually any contemplated system. The last serious – or should I say foolish – attempt was the Safeguard anti-ballistic missile system, dismantled in 1976. The laser array and its associated hardware and software components represent the solution to the heretofore unsolvable ballistic missile defense problem."

"Wait a minute, General," the President interrupted. "I have a hard time believing that *any* system is invulnerable."

"You're quite right, sir. For any given defensive or offensive system, it is possible to develop means to overcome it. That's why the 'arms race' has continued throughout all recorded history, and will continue forever. These developments, however, take time and effort. Historically, a radical advance in new technology – a technological breakthrough, such as is represented by the laser array – is usually good for at least five years. In this case, since the system is robust against every single penetration measure conceived and developed over the past two decades, I

would predict that we have an assured defense for at least ten years to come.”

“Fantastic!” the President exclaimed. “This opens up a whole new era in international relations and foreign policy. Obviously, we would be foolish to let the political potential that this military advantage gives us go unrealized. When will the system be fully operational?”

“Within a year. Compared to missile-based defense systems, the full-scale production costs of the laser array system are remarkably low. The major requirement of the system that could potentially be very costly is the massive electrical energy it demands, and this requirement can be met at no cost simply by tapping the existing commercial power network.”

The President turned to his press secretary. “Set up an appointment with the Secretary of State. We’ve got to completely reassess our foreign policy, and make it consistent with this mammoth change in the balance of power.” He turned to the General. “By the way, General, we’d better reevaluate our first-strike offensive strategies. A first-strike capability isn’t much without a set of procedures to actually implement it.”

“Yes, sir!” the General replied. “I’ll set up a meeting with the NORAD people right away.” The Commander in Chief was obviously pleased with the system and the General relished this moment of triumph.

“By the way, what are the implications of this system to our present deterrence systems, such as the MX system?” the President asked.

“They’re even more important now, sir. Militarily and politically, a first-strike capability gives us a tremendous advantage. When the Russians learn that we are developing such a capability, they might be tempted – were it not for our second-strike capability – to initiate a preemptive first strike right away, before our system is fully operational. Our MX system and the other second-strike or counterattack systems deter them from doing this. In other

words, our assured-destruction second-strike systems become even more important when we achieve a first-strike capability. It's also interesting to note that once the laser array system is ready it will increase the likelihood of survival of our second-strike systems, thereby enhancing their effectiveness."

"Excellent! You know, this gives me just the leverage I need to get Congress to expand the MX system to several other rural states. There has always been a question whether the system could in fact withstand a Russian first strike, and hence Congress was reluctant to spend money on it. Now, I can visualize our expanding the system to rural areas all over the US, not just in the Southwest."

"General," the President continued, "I'm really proud of the new system. It represents a turning point in the history of the US. Confident of our military superiority, we can once again assume a dominant role in world leadership. Our grandchildren will look back on this day as a great one in our history."

"Yes, sir!" the General replied, smiling broadly.

As they walked back into the control tower, the moon was just rising in the east. Thirty kilometers south of the test site, on a large boulder in a draw leading into a narrow valley, a coyote was howling at a blood-red moon.

IV. STARTING OVER

In the Chiapas Highlands, Mexico...

Juan Carrera and his wife were having a quiet supper alone together. The children were away for the evening, and she had decided that tonight should be a romantic evening. Juan had been away for part of the week, and had just returned that afternoon. She had put on a sheer white dress – his favorite, she

believed – and had put her hair up in a special arrangement, just for him.

The sun had set about half an hour ago, and the Milky Way's bright stars had blanketed the sky overhead. They were having their dinner in the atrium, next to the pool. This was her favorite place in the villa. It was the innermost section of the villa, surrounded on all four sides by the rooms of the villa. The atrium was quite large, and consisted of three sections, all open to the sky. The central section was a bath – actually, a swimming pool – along the lines of the baths found in the villas of ancient Rome, but larger. It was basically rectangular in shape, but with quarter-circles at each corner. Along each of the two longer sides of the pool were six fluted columns, with Doric capitals. On the west side of the bath was an open area that was set in light beige marble. They usually had out-of-door receptions in that area. On the east side was an open area that was planted in zoysia grass. It was generally used as a children's play area, but this evening it was the setting for their dinner.

The atrium was surrounded on all four sides by the rooms of the two-story house. A balcony with a wrought iron railing surrounded the atrium at the second story level. On the ground level, the atrium was circumscribed under the balcony by a slate walkway. Beyond the walkway were the walls of the first floor – solid glass panels, with a marble walkway on the other side. Beyond the interior marble walkway were the doors leading to the various rooms of the house. On the south side of the atrium, the area beyond the glass door/wall was quite large; this was the formal reception area of the house.

María had just served each of them a glass of red wine, and lit the candles on the table. The evening was quiet, save for the droning of the cicadas and the calls of some parrots off in the distance. Both she and Juan were in a pleasant, relaxed mood, and their conversation flowed smoothly. Juan told her about the business he had conducted in Puerto Madero. Through the

courses of the supper, the conversation turned from business, to the children, to plans for a foreign vacation next winter. The children had never been to a cold climate, and they discussed the possibilities of a ski trip to Canada or to Switzerland.

At the end of the meal, Ramón served them each a glass of Kahlua. Ramón had situated himself on the north balcony, and was playing some soft Spanish songs on his guitar. In the quiet of the evening, Juan looked thoughtfully at this beautiful woman at the other side of the two candles. He was very much in love with his wife. Not only was she beautiful, poised, and articulate, but she was kind, gentle, and a good mother.

At the end of the meal, she and Juan sat quietly, looking at each other. She was cooling herself with a hand fan. The evening was unusually hot, and the drinks had warmed her further.

“Let’s swim,” Juan suggested. “The water will be cool.”

María was clearing the table. Juan called to Ramón. “Thanks for the music, Ramón. That will be all. Sra. Carrera and I wish to be alone.” He turned to María. “Thank you María, that will be all.” María and Ramón absented themselves, leaving Juan and his wife alone.

They walked to the pool. As they reached the south, shallow end of the pool, Juan grasped her left arm gently and turned her around to face him. He looked into her eyes, and she smiled back at him. He reached up and removed the two silver combs that held her shiny black hair in place behind her ears, and let her hair fall over her shoulders. He reached to her shoulders, slid the straps of her dress down her arms, and slipped the loose-fitting dress down over her body. She was wearing nothing else, and stood fully nude as the dress fell to her ankles.

She smiled at him, and unbuttoned his shirt. He slipped it off, and removed the rest of his clothes. Taking her hand, they walked together down the steps into the pool. When they reached the deeper section, she dropped his hand, turned over

on her back, and floated on her back toward the far end of the pool, her head tilted back, fully submerging her hair.

Juan watched her swim. Her wet breasts reflected the pale moonlight as they reached her arms over her head. Near the far end of the pool, she arched her back and dived backwards into the water, turning a complete somersault underwater, swimming straight to the bottom of the pool where she curved back toward him. Swimming under the water, she reached the shallower portion of the pool where she had left him, and came to her feet in front of him.

Juan grasped her two arms in his hands, and stared into her eyes. "I love you," he whispered.

"Oh, Juan. I love you so. I miss you so terribly when you're gone. Don't ever leave me."

"Shhh," he whispered, "I'll never leave."

[Abridgement 2. Here follows a tender love scene, between husband and wife.]

Two years later...

As he reached the car, Juan Carrera turned around and took a last look at the house. The sun had just risen, and its bright beams flashed through the trees, painting the house in a patchwork of light and dark splotches. There was a very light mist hanging over the ground, and he could see the rays of the sun cutting horizontally over the lane leading up to the house. The mist diffused the light, giving the whole scene a soft otherworldly cast. Just for a moment, he wondered why he was leaving this beautiful and tranquil place, but he quickly caught himself. The children would be up shortly, and he had no desire to go through last night's goodbyes all over again. He stepped into the car and closed the door softly. The engine turned over a few times and started. He slipped into low gear and started down the lane.

As he passed by some of the countless thousands of coffee trees that had brought his family wealth through generations, he reflected on his current situation. He had just completed a three-year term as a member of the Chamber of Deputies – the lower house of the Mexican legislature. He could not succeed himself – even if he had wanted to – and his alternate was serving in his place for the next three years.

The year had been a rough one. His wife had died last spring, leaving him to raise four children – two girls and two boys. Granted, there was plenty of domestic help, but it seemed that no one could fully replace all of the caring, attention, and direction of a mother. It had hit the children pretty hard, but in the context of an extensive but closely knit family and home, they had adjusted to the new situation.

It seemed that the loss of his wife had hit him the hardest. At first he had thrown himself into his work. Lord knows there was plenty to do. With the maturing of thousands of new coffee trees, the family business had increased substantially. For years they had operated an export office in the port of Coatzacoalcos on the Bay of Campeche side of the Isthmus of Tehuantepec. Two years ago, they had opened a small export office on the Pacific port at Puerto Madero, in the Gulf of Tehuantepec. Most of their coffee holdings were in the Chiapas Highlands, located midway between the two ports. With the increase in the world price of coffee, earnings from their exports had been high, and the capital required to increase the family's plantings and promote the export office was quite adequate; business had flourished.

Perhaps because of the success of the family business, he had plenty of time to reflect on his loss. His father was still active in the business, and the demands the business placed on Juan were not heavy. He had grown more and more preoccupied with his situation, reflecting on where he was and where he was headed. Finally, in early summer, he decided that he needed a change to sweep him out of his general state of languor. He had

contacted several universities in the United States, requesting a position as a visiting professor for a semester. He held a doctorate in agronomy from a highly regarded university, and he had anticipated no difficulty in landing a position.

Although several US universities had extended offers, he decided to spend the semester at New Mexico University, where he could teach a course in tropical agronomy. The other positions were interesting, but his background in tropical agronomy seemed to better complement the New Mexico program than the other two. Also, its proximity to his brother's estate in Chihuahua would afford him an opportunity to spend some long-overdue time with his brother and his nephews and nieces.

Juan was leaving the highlands now, and passing through some of the more tropical areas of the Isthmus. His family owned some land in this region. There were a number of commodities in which the family held an interest – coffee, rubber, cotton, sisal, mangoes and livestock – but the major portion of their income was derived from coffee. Juan's brother, Raúl, had managed their cattle interests for several years before taking over his uncle's ranch in Chihuahua. Juan was not particularly interested in cattle, and after Raúl left, the size of the herds had gradually decreased.

Juan stopped briefly in Villahermosa to deliver some papers to a business associate concerning the disposition of their ownership shares in a sisal processing plant in the Yucatan, and continued on toward Coatzacoalcos. It was quite dark by the time he reached Coatzacoalcos.

Juan checked into a hotel near the center of town. After freshening up in his room, he headed for the lounge on the main floor. Although he was somewhat tired from driving, he was not sleepy, and he wanted to “unwind” for a while before going to bed. The hotel evidently was a fairly popular local spot, for there were a number of local people sitting in the lounge, in addition to the hotel guests. Juan took a seat and ordered a beer.

He glanced at the locals in the bar. He was struck by the “Americanization” of their clothing, and of the music that was playing. It seemed that the world’s dress was becoming a pair of blue jeans and a T-shirt with a motto on the front. He hadn’t noticed this so much down in Chiapas, but it was quite noticeable here in the north.

Juan reflected that it was a shame that the young people did not preserve their own culture to a greater degree, instead of adopting the “American” ways. But on the other hand, maybe homogenization was simply a natural consequence of industrialization – after all, it was difficult to deny that blue jeans and T-shirts were not about the most functional clothing available.

His reverie was broken by the discussion two Americans were having a few tables away. They were relatively young – in their late twenties. They didn’t really look like tourists, Juan surmised – probably here on business. What drew his attention to their conversation was the fact that they were soliciting two young Mexican girls. For a moment, a mixture of jealousy and anger welled within him. He resented these foreigners “making it” with Mexican girls. He couldn’t really blame the girls. The strong Catholic tradition of virginity prior to marriage encouraged prostitution. And the unemployment, underemployment, and too-often desperate poverty of his people made it very difficult for a young girl to say “no” to earning a week’s – maybe even a month’s – wages in a single night.

What really bothered him was the blatant soliciting on the part of the men. Damned bad manners, for guests in his country. They wouldn’t be this open at the local Holiday Inn in their own hometowns. Their openness represented a blatant disregard for his country and his people.

Not that all soliciting was objectionable. The soldier on R&R leave from an active war zone, for example. You could hardly blame him. Given the stress of knowing he might be dead tomorrow, at the very least he deserved the emotional release

and the gentle companionship that a female companion – even a hired one – could offer.

Oh well, he decided, whether he resented the Americans' procuring female services from Mexican girls or not was irrelevant. That was one part of human behavior that was not likely to change.

He finished his beer, paid the tab, and walked to the desk for his room key. The front desk attendant was a pretty young thing. She had a charming smile, and enthusiastically engaged him in some idle conversation.

"What's your name?" Juan asked at one point in the conversation.

"Teresita, sir," she replied.

"Teresita – that's a pretty name," he remarked.

"Thank you, sir," she responded politely, her eyes twinkling.

He asked her to have him called at six in the morning, and turned to leave for the stairs. Halfway across the lobby, he stopped. What the hell was he doing, anyway? He was lonely, he wanted her, she wanted him. He turned around; she was smiling her come-on smile. He returned her smile and walked back to the desk.

"What time do you get off, Teresita?" he asked.

"Ten o'clock, sir," she answered, her eyes twinkling, as she pressed her tongue against her upper lip in a sensuous projection of 'body language.'

"May I see you this evening?" he asked, smiling, his intentions obvious.

"I'd be delighted, sir," she responded.

The next morning, Juan continued north. As he approached Veracruz, he pondered whether to turn west toward Mexico City. He had been over that route several times, however, and he decided to follow the Gulf Coast north to Tampico before heading

west. He enjoyed the drive along the coast; the countryside was different from the region he was used to.

After spending the second night near Tampico, he headed west toward San Luis Potosi and Zacatecas. The land here was considerably more arid than in Central Mexico. At Zacatecas he turned onto the main route north, which he would have already been on had he taken the route through Mexico City. After leaving Torreón, the land became progressively more arid. The soil was in general too poor to support farming, but the natural vegetation supported substantial livestock production. The rich grasslands of Chihuahua, Mexico's largest state and largest cattle-raising state, were apparent as he neared his brother's ranch. The vastness of the region struck him once again as it had on his previous visits to the area.

Near the capital city of Chihuahua, he turned off the main road onto the secondary road that led to Raúl's ranch. In the distance, he noticed large herds of cattle grazing on the hills and in the canyons of the region.

After an hour on the secondary road, he reached the dirt road leading into Raúl's ranch. From the turnoff, he headed up a slight grade toward a few hills that blocked his view. His brother's ranch was located in – and in fact comprised – a valley lying behind the low hills. The valley was quite hidden from the secondary road. As he drove between two of the low hills that faced him, the valley came into full view.

It was quite a sight. Surrounded by hills on all sides, it formed a majestic basin that led off into the distance toward the Sierra Madre Occidental Mountains. The Mexican plateau had to be one of the most beautiful places in the world, Juan thought. The foreground included some scattered large cacti, which blended into a panorama of green vegetation spread over the beige land. In the distance, the blue-green foothills stood in contrast to the lighter blue-gray Sierra Madre Mountains in the far distance. The

scene was set off by a clear blue sky punctuated with a few white clouds.

As he drove down into the valley he appreciated the compelling force that had drawn his brother to this place. The valley seemed isolated from the rest of the world. Whether or not it was true, it might seem that here one was in control of his destiny.

The ranch house was located about one-third of the way into the valley, along its south side, on a slight elevation. The ranch house was a grand Spanish-colonial structure, which had to be well over one hundred years old. As he drove up to the front entrance, he saw his two nieces, María and Juanita, playing in the front yard. They looked up as he stopped his car, and recognized him as he stepped out. María ran to greet him as Juanita ran to the house to announce his arrival.

Juan spent the next three days at Raúl's, simply enjoying the company of his brother and his brother's family. They were all well and happy, María and Juanita delighted in talking with their favorite uncle, and the two boys, Pedro and Ramón, enjoyed showing off their riding and roping skills on their several horseback rides over the ranch.

Raúl was generally in good spirits, but he was worried over the prospects of retaining the ranch intact in the face of Agrarian Reform. The location of the ranch helped – there weren't many *colonos* (colonists) in this area. Moreover, the valley had but a single water source, located at the remote end. The valley was somewhat of an enclave, surrounded by less productive land, and it was not really suitable for expropriation and redistribution.

Juan sensed in Raúl the same close ties he felt himself to the land that he and his ancestors had worked. Raúl had taken over this ranch from his great uncle Luis, and Luis had died with no children. As boys, both he and Raúl had visited here in the summers. Early on, Raúl had developed close ties to Luis, to the ranch and to cattle raising; it was not unexpected when Luis left the ranch to Raúl.

More than a livelihood, the ranch represented a part of the Spanish and Indian heritage that both men accepted and fostered. While principally of Spanish stock, their great grandmother was part Mayan, and their uncle Luis often spoke of the Aztec blood flowing through his veins. They did not so much resent losing their land to other mestizos *qua* mestizos – they resented the fragmentation and manifest destruction of what they had received in trust from their ancestors.

Juan enjoyed his brief stay at Raúl's. More than anything he enjoyed seeing the health and happiness of his brother's family. The visit did much to lift his spirits, and it was in a considerably elevated mood that he left early on Saturday morning for the United States.

The drive from Chihuahua to Ciudad Juarez passed quickly. Juan had begun the day fully rested, and he was still not tired when he reached the border. It was late in the evening when he crossed. His papers were in order, and there were no delays. As he drove through El Paso, he noticed how much he had forgotten about "the American scene" since his year at Davis. At the same time, much appeared to have changed. There were more "junk food" establishments, but they were architecturally better looking than before. Even the service stations were stylish, in comparison to the standard white brick buildings that were still common in Mexico.

As he drove from El Paso into New Mexico, he noticed that although the roads were far better and neater than in Mexico, the countryside – from what he could see in the bright moonlight – was about the same. It occurred to him that all he was looking at was in fact once part of his country. Texas, New Mexico, Arizona, California, Utah, Colorado – all had been under the Mexican/Spanish flag. How times changed.

His radio was set to a US station now. Granted, there were Spanish-speaking stations on the dial, but he needed to get back

his “ear” for English. He had it tuned to a country and western station. A popular *norteamericano* performer was singing the song, *I Don't Like It, But I Guess Things Happen That Way*. He followed the words of the chorus. The words didn't help his mood any. He reflected on the loss of his wife. He reflected that he was reflecting too much. He was here to renew his spirit, not meditate on the past. As he completed his trip, he resolved to approach his new undertaking with determination, optimism, and enthusiasm. Tomorrow was a new day.

V. REVELATION

Juan had little trouble finding an apartment. The one he settled on was furnished and quite near the university. He would be able to walk to his office at the school.

On Wednesday, he visited Professor Roger Stevens, head of the Department of Agriculture at the university. He and Roger had an interesting discussion about the university's program in agriculture, and its goals. Roger was quite interested in improving the international aspect of the department. Historically, emphasis of the department had been oriented toward the US environment and technology. With the rapid growth of development in the third world, however, Roger saw a concomitant growing need for more agricultural engineers, agricultural economists, and agronomists. Unfortunately, the number of US academicians with experience in these fields in the context of a less-developed country, and in a tropical setting, was very limited. He expressed his pleasure at having Juan visit for the semester and his hope that his stay might in fact be extended.

Registration for the students was scheduled for Thursday and Friday, with classes to begin next Monday. Juan's course, Tropical Agronomy, was scheduled for Tuesdays and Thursdays. He had taught aspects of this subject many times in the past, but

never in English, and never to students having little or no background in tropical agriculture. Also, this course was to be a one-semester course, rather than a two-semester course. For all of these reasons, Juan would find it necessary to put a good deal of work into his notes. He planned to have them typed as he taught the course, so that at the end of the course he would have a ready-made monograph on the subject.

The first two weeks he found himself very busy preparing his notes. By the end of that time, however, he had completed his outline for the entire semester, and his workload decreased somewhat. His classes went very smoothly. After a week or so, his English was as good as ever. His students were quite bright and highly motivated. He had a mix of students – those working on their Master of Science degrees, and those working on their Ph.D. degrees. Since Juan would be there for only one semester, Dr. Stevens had required most the Ph.D. students to attend the course.

On the days on which he taught, Juan ate lunch at the faculty club. Usually, he bumped into another professor from the Department, and passed an interesting lunch discussing the backgrounds and experiences of the other department faculty members.

On one particular Friday, he arrived a little late. There must have been something special going on, for the dining room was more crowded than usual. The meal was served buffet style that day. After serving his own plate, he glanced around the room for a place to sit. There was no unoccupied table, and so he asked another faculty member seated at a table for two if he would mind sharing his table. He said not at all.

Juan sat down and introduced himself. His luncheon partner did the same. He was Dr. Bill Anderson, a professor in the mathematics department. It turned out that they had something in common. Bill held a Ph.D. degree in statistics, and taught

courses in Experimental Design and Operations Research. A few of the students in the Agriculture Department attended his course. He was teaching the course in Operations Research this semester.

Juan had a “classical” background in mathematics – analytic geometry, calculus, differential equations, and some training in statistics – but he had little knowledge of many of the techniques of modern mathematics, such as optimization, game theory, decision theory, time series analysis, and the like. Bill was evidently skilled in many of these topics. Juan asked him if he could be so kind as to indicate some of the agricultural problems that would require the application of sophisticated operations research procedures.

Bill gave a good example of a problem in which a farmer had a limited amount of land and capital, and wanted to determine the optimal mix of crops and livestock to produce, subject to the various constraints. He said that this problem could be solved by relatively simple procedures, such as “linear programming.”

Bill clearly enjoyed talking about his subject, and he rambled on to discuss the fact that the really interesting optimization problems occurred in the area of weapon systems analysis – “differential games,” “nonzero sum games,” “time-sequential games,” “nonlinear, nonconvex, discontinuous objective functions,” and the like.

At this point, the conversation was becoming a waste of time for Juan, since he had little idea of what Bill was talking about. Out of politeness, however, he asked Bill to give him an example of a practical application. Coming back down to earth, Bill laughed, and asked, “Do you remember the controversy over the deployment of ballistic missile defenses in the US?”

“Why, yes, I do,” Juan responded.

“Well, the problem of deciding which targets – such as cities or missile sites – to defend is very difficult to solve. There are several problems that arise – first, we don’t know how many

missiles are being sent against our targets, and the nature of the defense for one level of attack may be quite different from that for a different level of attack. Second, we have two kinds of defenses – ‘terminal’ defenses, which can defend only one target, and ‘area’ defenses, which can defend a number of different targets. The problem that arises is that, whereas for a light attack the area defenses should ‘take on’ all comers, for a heavy attack the defense becomes saturated and cannot destroy all the incoming missiles; it must decide which targets are to be saved and then defend only those targets. The third problem that arises is that as the attack becomes very heavy, it is necessary to save ‘combinations’ of targets, such that we will be left with an integrated industrial base. For example, there is no point in saving all of the steel mills, if all of the people are killed, or if all of the factories are destroyed, or if all of the energy sources are destroyed. We need to save a balanced mix of the industrial and population bases. In other words, saving a lot of any one component of the economy is of relatively little value, because of the interdependence between the sectors. In mathematical terms, we have a ‘nonadditive utility function,’ or a ‘nonseparable’ optimization problem. These are just some of the problems that arise. In mathematical terms, we have a ‘subtractive overlapping-island defense with imperfect defenses, a nonlinear nonseparable objective function, and imperfect knowledge of the attack size.’”

Juan was not particularly impressed with the technical discussion, but he wasn’t finished eating, so he continued the discussion. “Well, does it all really make much difference? I mean, does it make much difference whether we use a fancy mathematical optimization procedure to determine the strategy, versus a simple defense such as shooting down the enemy missiles as they come?”

Bill was taken aback. Obviously, Juan hadn’t understood a word he’d said. “Well, of course it matters! The use of optimal strategies makes a tremendous difference! Consider the MX

missile system, for example. The determination of its location was a strategic decision affecting the lives of millions. When it's fully deployed, if the Russians attack, the radioactive fallout will be so heavy that your country could be wiped out, without having been hit by a single bomb!"

"What?" Juan's attention was suddenly riveted on what Bill had said. "What do you mean?"

"Well, as you may be aware, the MX system is a land-based system of intercontinental ballistic missiles deployed over the Southwest. There are many more missile sites than missiles. The missiles are moved from site to site in such a fashion that the enemy can't tell which sites contain missiles. Therefore, they have to attack all of the sites to be sure of destroying all of the missiles. Since they don't currently have enough missiles to do this, the plan is that they will be deterred from attacking us at all in the knowledge that some of our missiles would survive and we could retaliate. The problem that arises, however, is that if the Russians *do* attack the MX system, they will explode a very large number of high-yield surface bursts over the southwestern US. As you may be aware, high-yield surface bursts produce an incredibly large amount of radioactive fallout. Generally, the prevailing wind blows this fallout toward the east, and a moderate percentage of the US population would be killed. At certain times of the year, however, the wind could be blowing toward Mexico. If this happens, your country's food production system will be contaminated for a thousand years, and there will be such a 'hot spot' of radioactivity on the Central Mexican Highlands that the core of urbanized modern Mexico will be totally destroyed. What was once the seat of the Aztec Empire will be destroyed, once and for all."

"I can't believe what you're saying!" Juan protested. "We would surely have heard of this threat!"

"Well, you can believe me or not," Bill retorted. "The facts stand. If you don't believe me, why don't you talk to Jack

Campbell at the University of Arizona? He's an expert in optimization and ballistic missile warfare. What I told you isn't original with me – he told me about it. Give him a call – he's a good friend of mine, and I'm sure he'll tell you about it if you mention my name. Well, I've got to be going. Nice talking to you," he added, as he got up and walked away.

Juan was stunned. It didn't make any sense. Ballistic missile warfare had been studied intensively in the sixties. As a member of the Mexican Chamber of Deputies, he had been briefed on the general nature of the US ballistic missile system, but there had never been any mention of a threat of this magnitude to Mexico. At first, his reaction was disbelief. He tried to think of reasons why it could not be true, but he simply didn't know enough about the subject of nuclear warfare. Finally, he decided that the stated threat was so serious that it could not be ignored. The consequences were so severe that, if there were *any* chance that it might happen, some counteraction must be taken. He had to determine beyond any possible doubt whether this threat was imaginary or real. Clearly, he had to find out more.

Bill had mentioned Jack Campbell at the University of Arizona. Juan would try to get in touch with Campbell, and query him on the subject. He returned to his office to place the call.

VI. CONFIRMATION

Juan called the main number at the University of Arizona and asked to speak with Prof. Jack Campbell. The university operator said that she did not show a listing for a Prof. Jack Campbell. Juan said that he was certain that he was a professor at the university, and would she please double check. She checked again, with no luck. She asked with what department he was associated. Juan said that he wasn't sure – maybe mathematics. The operator put him through to the math department. He asked

the department secretary if there were a Jack Campbell on the faculty. The secretary said yes, but he taught only part time, and was not a regular faculty member. Juan asked if he could speak with him. She said that he taught a course on Friday afternoons, and did not maintain a regular office at the university. He had his own research company, she explained, and gave Juan two numbers where Dr. Campbell could be reached – one in Phoenix and the other in Tucson.

Juan called the Phoenix number. The telephone receptionist answered “Tucson Research Corporation.” He asked to speak with Dr. Campbell. The receptionist said that he was at the Tucson office today, and would not be in Phoenix until tomorrow. Juan thanked her, hung up, and dialed the Tucson number he had been given by the university operator. He remarked to himself at the somewhat tortuous path he was following to get in touch with Campbell, and that he might have saved himself some trouble had he simply asked Bill Anderson for Campbell’s telephone number.

At the Tucson number, a receptionist answered, as before, “Tucson Research Corporation.” Juan asked for Campbell, and, finally, he was connected to his party.

“Dr. Campbell?” Juan inquired.

“Yes?” Campbell replied.

“My name is Juan Carrera. I am a professor of agronomy at New Mexico University. At lunch today I was talking with Prof. Bill Anderson on the faculty here. I believe you know him?” Juan queried.

“Why, yes, of course. What can I do for you?” he responded, perfunctorily.

“Well, Prof. Anderson told me that you had conducted some analysis of the possible impact of radioactive fallout on Mexico, in the event the US is attacked by nuclear weapons. My family lives in Mexico, and I was very interested to learn more details about the nature of this possible threat,” Juan explained.

“Of course. I’d be happy to talk with you. Is there something specific you’d like to know?” Campbell asked.

“Well, Prof. Anderson told me that the potential magnitude of the threat was very great – in essence that Mexico could be destroyed in the event of an attack on the United States. I want to determine whether this is true, and second, what is the nature of the analysis or assumptions that led to this conclusion,” continued Juan.

“Well, I can assure you that the threat is real. I have done a good deal of analysis on the matter, and am completely convinced of the validity of my conclusions. As for the details of the analysis, it would take quite a while to explain them,” Campbell explained.

“I am really very interested in your results. Have you published them?” Juan asked.

“No, all of my results are in the form of rough notes and computer printouts,” Campbell responded.

“Well, would it be possible for me to meet with you to get more details on the situation? I know that this may represent somewhat of an imposition, but I am really concerned over the implications of your results for my family,” Juan pleaded.

Campbell hesitated for a moment, and then responded, “Well, I am pretty busy during the work week, but I would be glad to show you my results some weekend, if you happen to be in Tucson sometime.”

“That would be fine,” Juan quickly replied. “Could I meet with you this weekend?”

“Okay,” said Campbell, laughing. He was evidently amused at Juan’s eagerness. “I’ll be at home both Saturday and Sunday. But are you making a special trip?” Campbell asked, in a feeble attempt to stall the get-together.

“Oh, no,” Juan countered. “I have just recently arrived in the area, and look forward to seeing the countryside on the weekends. What time should I meet with you?”

“How about Saturday morning? Or will you have time to get here?” Campbell inquired.

“That will be fine. I have no classes on Friday. I’ll see you on Saturday,” Juan replied.

Juan got directions to Campbell’s house, and they concluded their conversation.

The next day, Friday, Juan began the trip from his home to Tucson. As he drove along Interstate 10 toward Tucson, Juan wondered whether this was a foolish waste of time. If the threat were real, it would surely have been perceived. But Campbell sounded intelligent, and he evidently had the academic background to conduct a competent analysis. In any event, Juan’s responsibility as a Mexican citizen and a once and future member of the Chamber of Deputies required him to check it out.

The drive to Tucson was uneventful. The countryside was essentially homogeneous over the route – flat, dry, desert, except for the drive through the Texas Canyon. It was late afternoon when he reached Tucson. He had reservations at an old inn that had been recommended by the department secretary. It was very charming. He could feel the ghosts of the past in the quiet sitting room.

His room was decorated with pictures of Indian chiefs from a bygone era – Apaches, Navahos, Comanches. He was amused by their accoutrements – they invariably displayed a presidential medal hanging in the middle of their chests. He contemplated the irony of the medals. Cheap junk, he mused. The chiefs had been duped. They displayed the medals with obvious pride – a manifestation of Washington’s supposed respect for their position and people. How fortunate, thought Juan, that the strong brave chief of thirty years could not see the broken chief and the broken tribe and the broken dreams and the broken culture of a generation later.

Juan contemplated for a while the hopeless odds in the endless competition for space between a low-technology culture and a

high-technology culture. The low-technology culture appeared inevitably to lose. Perhaps it was a law of evolution – the means of “improving” the human gene pool – but to the losers, it seemed wrong, and unfair, and tragic. He related the Indians’ plight to his own current situation. If what he had learned yesterday were true, his own culture could be wiped out – an ignored casualty in the struggle between two technological giants. For a moment, he sensed the desperation of the situation, as his Indian forbearers must have sensed their own plight. His sense of helplessness and frustration blended into a mood of anger and determination as he slipped into an uneasy sleep.

The next morning after breakfast Juan called Jack Campbell. He sounded friendlier today than he had Thursday at the office. Juan asked if the time were okay for him to drop by. Campbell replied, “Fine, come on over.” He gave Juan directions from the inn to his home in the Santa Catalina Mountain foothills on the north side of town.

Campbell’s home was a spacious Territorial-style home with a splendid view of the city. The grounds were well planted with cacti. Juan deduced that Campbell must be successful in his business.

Juan was greeted at the door by a maid, and asked to be seated while she got Dr. Campbell. A few moments later, Campbell walked into the room. He was tall, with a friendly demeanor. He extended his hand and graciously welcomed Juan to his home.

“Breakfast has just been served,” Campbell spoke enthusiastically. “Won’t you join me?”

Juan caught himself from saying that he had just eaten, and replied, “I’d be pleased.”

As they sat down to breakfast, Campbell requested, “Tell me about yourself – what brings you to the United States?”

Juan gave him a thumbnail sketch of his background. At one point, he addressed Campbell as “Dr. Campbell,” at which point

Campbell interrupted and insisted his name was Jack. After he had filled Jack in on his own background, Juan in turn asked Jack to tell a little of what he did.

Jack held a Ph.D. degree in Operations Research from a major West Coast university. He had begun his professional career working in weapon systems analysis, specifically in ballistic missile warfare. He had found the field to be very stimulating from a mathematical point of view. The intellectual demands of the complex systems problems were very great, and he had enjoyed his work in the field very much. He had worked for several years for a large US contract research corporation on the West Coast. After a few years, however, he had decided to set up his own consulting firm. One of the problems in getting started in the weapon systems field, however, was the difficulty in obtaining access to classified material. In short, you couldn't have access to top-secret material without a "Need to Know," and this was impossible to establish for the purpose of writing proposals for new business. Because of the difficulties, Jack had found the defense studies market difficult to penetrate on his own as an individual. As his consulting business grew, it was in non-defense areas – primarily industrial clients with problems in scheduling, process control, and forecasting.

After a few years in the Los Angeles/San Francisco areas of California, Jack had decided to leave the crowded West Coast for a more desirable place to live. He eventually settled on Tucson as having the ideal combination of weather, uncrowded conditions, no pollution, and friendly people. In fact, it was both within a few hours' drive of the Sea of Cortez beaches, and just a short drive from the ski slopes. Jack conceded that the completion of the new IBM plant, housing prices and traffic problems had increased substantially, but it was still a nice place to be located.

Jack mentioned that one of the several reasons he had left the large city environment was the threat of destruction from nuclear

war. He was by no means paranoid on the matter, but the low level of threat from either blast or fallout had been one of the factors in his deciding on Tucson as a permanent home.

At that time, there was nothing of particular value for an enemy to target in Tucson, and major targets to the west – San Diego, Los Angeles, San Francisco – were sufficiently far away that the chance of heavy fallout from them was not particularly high. In fact, it was this very factor – the risk of damage to Tucson in a nuclear attack – that had ultimately led to his resumed interest in nuclear weapons attack analysis. What happened was that the relative safety of Tucson had changed markedly with the US government's decision to deploy the MX missile system in the southwestern US. He had perceived immediately that, if the system were deployed in the Southwest and were to be attacked by the Russians, then the resulting levels of fallout could cause a high level of casualties in Tucson. Since he had conducted numerous damage assessments involving radioactive fallout in his weapon systems analysis days, he spent the time to develop some relatively sophisticated fallout prediction models.

Early in his analysis, Jack had decided that the fallout prediction models that had been developed in the early 1960s were not at all adequate as means for estimating the magnitude of the threat to Tucson. The early models were based on idealized fallout patterns, average wind conditions, and average attack conditions. Furthermore, the simulations that had been done were oriented toward determining the average or "expected" number of casualties from fallout. They were not developed and could not be used to accurately predict the distribution of fallout intensity at a particular location. What was needed was a model that would enable the analyst to specify a *particular* set of attack characteristics (number of weapons, weapon fission yields, heights of burst, defense characteristics, etc.) a *particular* set of wind conditions, and a *particular* topography, and then estimate

the likely magnitude of the fallout intensity at a *particular* location – in this case Tucson.

Jack went on to explain that the early fallout models were used primarily for “macro” damage assessment, whereas he needed a fallout model for “micro” damage assessment. He was interested in the statistical probability distribution of the level of fallout damage at a particular site. In the “macro” situation, such as the case of estimating fallout casualties for the US as a whole, it was quite all right to use idealized fallout patterns, average wind speeds, and the like. The reasoning was that as wind conditions and attack conditions varied, the *particular* cities to be affected by the fallout might vary, but the average total number of casualties did not vary considerably from one attack or set of wind conditions to another. In statistical terms, the “law of large numbers” was coming into play, and the uncertainty, or “variance” of the overall casualty estimate was small.

For a *particular city*, however, it was not at all the case that the expected level of casualties was relatively constant. Quite the contrary, depending on its location or on which way the wind was blowing, the level of damage to the city could vary drastically, from a level of no casualties to virtually total destruction. For example, in a “macro” damage assessment, it might be the case that 30% of all US citizens would be killed from fallout radiation, and this figure might vary from 20% to 40% as wind conditions or the nature of the attack varied. On the other hand, the level of damage would vary substantially from city to city, and it could vary considerably for the same city as conditions varied from attack to attack. For some cities, the level of danger would be low for virtually any attack, whereas for other cities the likelihood of receiving high fallout levels depended substantially on the nature of the attack and on weather conditions at the time of the attack. These variations in expected damage levels from location to location and from attack to attack were very significant to the individual – for a particular city and a particular attack, all of the

citizens might be alive after an attack, or none of them might be alive. In other words, although the expected odds for survival might be relatively high for the city on the whole, the variance could kill you.

Jack's objective in developing his micro damage assessment model was to be able to estimate the distribution of outcomes for Tucson – a graph that indicated the probability or likelihood of each possible level of damage to the city. Over the course of a few months, Jack related, he had constructed a computer-based mathematical model that estimated the fallout threat to any particular location, given the analyst's specification of the nature of the attack. His initial conclusion was that, if the Russians attacked the MX system, there was a high likelihood that Tucson would receive a high level of radiation. This was disappointing to say the least – his home was no longer a safe place to live.

Next, he began to conduct analyses on different locations, in an attempt to determine some of the safer ones. It was during the course of this analysis that he had noticed that the nature of the threat to locations in northern Mexico was somewhat similar to the threat to locations in the southwestern US. Upon further analysis, however, he observed that while the situation in the US was characterized by low variation in total casualties nationwide (because of the large area of the country and the number of cities), the variation in the total number of casualties nationwide in Mexico was *not* low. Rather, because of the smaller size of the country, and the unique topographical structure of the country, there was a very good chance that for some attacks, *most* of the country would be destroyed by fallout.

Jack had estimated that following a Russian attack on the MX system, the average level of casualties in Mexico would be around 15% of the population killed. Unlike the situation in the US, however, there was a substantial “standard error,” or variability associated with this estimate. In some attacks, no Mexicans were killed. In about 5% of the attacks that Jack had

analyzed, however, virtually the entire population was destroyed. Moreover, the levels of radiation in the northern cattle-raising section of Mexico were so high and widespread that food raised in this area could not be consumed for centuries, without substantial risk of cancer caused by ingestion of radioactive materials. It was these latter observations that Jack had revealed to Bill Anderson.

At this point, Jack realized that he was doing virtually all of the talking. He caught himself and said, “Aha! But I’m getting ahead of myself! You simply asked me for some background on what I do, and I’ve gotten quite carried away on one of my favorite topics.”

Juan protested, “No, no! You’re discussing exactly what I wanted to learn more about. But tell me, do you still have the actual results on Mexico? Do you still have the computer printouts? What assumptions did you make in your analysis of Mexico, about wind direction, attack size....”

“Hold on!” Jack laughed. “For the details we’ll have to go down to my office in town. I’m not sure I’ve kept all of the computer runs, but I can run off several new runs to give you a general idea of what’s going on.”

They finished breakfast and walked outside to Jack’s car. It was a high-powered sports coupe – an early model Jaguar XKE. On the drive down the mountainside to the city, Jack talked about some recent work he had done on the car. He had installed some high-performance headers, and replaced the stock dual muffler system with some “straight-through” bullet-mufflers. God, but it was loud! Evidently, Jack did all his own work on his car. He explained that in his opinion it was just about impossible to keep an “E” in tune without spending a lot of time on it. He enjoyed the diversion on the weekends of working on the car. It was a real beauty – real wire wheels, a gleaming gun-metal-gray coat of paint – he’d painted it himself. Jack obviously enjoyed putting the car through its paces. Juan sensed Jack’s fascination and satisfaction in controlling the powerful machine.

They soon reached Jack's office. Juan was surprised. He had expected to arrive at a modern office building. Instead, they pulled up to an old Spanish-colonial-style house. Jack explained that he preferred the privacy of his own small office building. The house was located in a primarily residential section that evidently had been zoned commercial.

They entered Jack's house/office building. It was Saturday, and no one else was there. Jack turned on some lights and they walked to his office at the rear of the building. Jack's office was very comfortably appointed. It was at the same time both handsomely decorated and functional. At one side of the room was a large table. At one end of the table were two remote computer terminals – one equipped with a keyboard and cathode-ray tube, the other similar to a typewriter. Most of the table was covered with computer printouts. Jack apologized for the "mess," commenting on a hectic schedule last week.

Jack walked over to a bookcase and removed a set of computer printouts that were bound in a bright red plastic binder.

"I've kept some of the old computer printouts in this binder. I'm pretty sure I have some on Mexico. Any more, I almost always use the computer monitor. It's quieter, and faster than waiting for a printout. Unfortunately, I don't make as many hard-copy listings as I should. If I don't find what you need I can run one off again," Jack commented.

Jack leafed through the printouts. He showed Juan some of the results for Tucson. Jack had analyzed the situation under a variety of attack conditions – heavy attacks, light attacks; counterforce attacks, countervalue attacks; winter attacks, summer attacks; first-strike attacks, second-strike attacks; clear weather, and rain. He explained that he had used a standard defense strategy for all of the attacks – the "subtractive" strategy that Bill Anderson had discussed – but with a simple "separable" payoff function. The payoff function varied between emphasizing the defense of population and the defense of industry. For each

set of attack specifications and defense characteristics, Jack's program showed the impact on Tucson – the number of direct blast casualties, indirect blast casualties, early fallout casualties, and delayed fallout casualties. It also showed the percentage of industry that survived the attack, and the percentage of nearby agricultural lands that were destroyed by fallout, or "interdicted," as Jack put it.

Jack walked over to a nearby bookcase and removed a sheet of paper from a sheaf of papers.

"Here is a summary of the impact of the attacks on Tucson," he said as he handed Juan the paper. "By estimating a 'subjective' probability associated with each attack characteristics and weather conditions, I'm able to estimate the likelihood, or probability, of a particular outcome for Tucson. Each of the probabilities is indicated on the corresponding printout," he added as he pointed to a number on the upper left hand side of each printout. "As you can see, some of the scenarios I've examined are rather unlikely to happen. In general, however, you'll see that the destruction of Tucson is relatively high for any attack in which the Russians strike first."

"Why is that?" Juan asked.

"Well, if they strike first, they will attempt to wipe out the MX system so that we can't destroy their cities in retaliation. In other words, they employ a 'counterforce' attack. Hence there are a large number of surface bursts in the southwestern US. On the other hand, if we strike first, then the Russians will conclude that most of our missiles have already been fired from their silos, and there is hence little point in attempting to destroy the silos. Instead, they aim most of their missiles at our cities – a 'countervalue' attack," Jack explained.

"Well, what is your conclusion?" Juan asked.

"Quite frankly, I'm debating moving from Tucson to a safer location. In fact, with the recent growth of industry around

Tucson, it has an increasing chance of being targeted directly – and just more reason to move,” Jack declared.

“Where will you go? Where is a safe location?” Juan asked.

“Well, here in the US the safest places are along the West Coast, away from the population centers,” Jack explained. “Of course, out there you’ve got the earthquake problem instead,” he added. “Quite frankly, I’m giving more and more thought to moving out of the country altogether. There are several other countries that are large enough and rich enough to have the potential for very high standards of living eventually, yet are not currently likely targets. Brazil, for example,” Jack continued.

“But what about Mexico? Do you have any printouts on Mexico?” Juan asked.

Jack leafed through the printout binding, but found none. “Evidently, I threw them all away,” he concluded. “But I can run you off a typical case right away.”

Jack went over to the computer terminal, turned it on, and proceeded to set up the run. He talked to Juan as he worked, describing the assumptions he was making, and estimating the likelihood that each assumption was true. At one point, he needed to make an assumption about the direction of the winds. Jack explained that the US Weather Bureau published upper-atmosphere wind charts that specified the wind vectors at various altitudes. The information on these charts – wind direction and speed at various altitudes – was combined in Jack’s computer program with topographic information to produce a “fallout pattern” – a contour map showing the radiation intensity at each point on the map. Jack explained that the fallout analysis that had been conducted in the 1960s was based primarily on mean seasonal wind vectors. He showed Juan a copy of an “upper-air fallout” or UF map made in 1962 by the US Weather Bureau. The map was based on the mean summer wind vectors. Jack then showed him a second map of the United States, which showed the idealized fallout patterns that could result from a specified

attack, using the mean summer wind vectors. The map showed the fallout patterns stretching across the US from the west to the east. Mexico was unaffected by the fallout.

Jack explained that although the use of mean seasonal wind vector charts was satisfactory for estimation of overall fallout casualties in the US, it was totally inadequate for use in estimating the expected level of fallout at a particular place, such as Tucson, or for that matter, for a relatively small geographic area, such as Chihuahua state.

Jack explained that he had a file on a set of wind vector maps for a complete year. In order to assess the potential magnitude of the danger to Mexico, he would select the wind vector maps for a day in which the upper-altitude winds were blowing generally toward Mexico. Jack leafed through his set of charts, and selected such a map. He showed it to Juan, commenting that the map he selected was fairly typical of a winter day. Jack typed in the number of the day corresponding to the map he had selected, explaining that he had stored the information on these maps in a computer file. Jack said that he was going to add a few areas of precipitation – high altitude thunderstorms – to the map, to show Juan how severe the fallout could be if it happened to be raining as the fallout cloud passed by.

With regard to topography, Jack explained that he had stored in his computer database the macroscopic topographic features for all of North America – mountain ranges, valleys, deserts, forests, plains, lakes, rivers, and so on. Since this information was fixed, no assumptions were required regarding topography. Also prestored in the database was information on the areal distribution of population in cities and over rural areas.

The database included information on the average fallout protection factors – or “PFs” – at each point. The PF indicated the extent to which the radiation was attenuated, if the individual stayed indoors. Jack explained that the early fallout decayed rather rapidly – by the “ $t^{-1.2}$ decay law,” he said – so that if the

fallout in a particular area were not too severe, many deaths from early fallout could be avoided by staying inside heavy concrete buildings for a week or so following the attack. The number of deaths could be further reduced by implementing radiological countermeasures, Jack added.

Jack explained that, in addition to the PFs, he had information on the “hardness” of each target – city, missile site, or defensive installation – in the US, Canada, and Mexico. The hardness numbers were used in a “damage function,” which indicated how much damage was caused to a city, or what the probability was of killing a hardened “point target” such as a missile site. Jack explained that the damage function took into account the yield of the weapon (which indicated the strength of the blast), the fission yield (which indicated how much radioactive material would be produced), and the height of burst of the detonation. He said that he used an “exponential” damage function for point targets, and a “composite” or “weighted exponential” damage function for area targets.

Jack explained that none of the data in his database were classified – he had compiled them from sources such as the US Census for population data and city characteristics and *Aviation Week and Space Technology* for typical offensive and defensive weapon system characteristics, such as weapon stockpile sizes, CEPs (weapon accuracies), yields, MIRV characteristics, defense effectiveness, radar characteristics, penetration aids, and the like. After all this explanation on “hardness,” Jack indicated that the hardness figures were in fact irrelevant to the present analysis, since he was assuming that no sites in Mexico were targeted – i.e., that fallout from detonations on US targets was the only danger.

When Jack had finished the set-up, he started the run and sat back in his chair. Juan watched the computer screen. Jack had developed a very sophisticated program. The monitor display featured a map of Mexico, showing its major topographic features

and cities. While they waited, Jack explained that the computer program was simulating a number of possible outcomes of the attacks under the assumptions and conditions he had specified, and assessing the damage corresponding to each outcome.

Before long, the screen changed. It now displayed the expected damage to each of the sites Jack had specified, under each of the simulated attacks. Jack explained that for a complete analysis, a large number of simulations should be conducted, in order to develop a good estimate of the distribution of damage outcomes for each site. In addition, a complete analysis would include runs made for a random sample of wind patterns, in order to indicate the average level of the threat, as well as the relatively pessimistic case he was analyzing, corresponding to an unfavorable wind direction. The few simulations he had conducted, however, would illustrate the potential danger of the situation quite adequately.

Juan looked at the screen. The message it conveyed was frightening. Under the conditions that Jack had specified – and they were reasonable – the damage to Mexico was severe.

“This is incredible!” Juan blurted.

“As you can see,” Jack explained, “Mexico’s agriculturally productive region resembles a large funnel, with the mouth along the US border, and the small end near Mexico City. As the fallout cloud heads south, there can be a substantial buildup of radioactivity in places where the elevation rises rapidly. The fallout deposits in such areas can be quite concentrated, producing ‘hot spots’ in which the chance of survival is extremely low,” Jack continued. “One of the most unfortunate aspects of the situation, from the point of view of Mexico, is that the ‘law of large numbers’ does not operate in your favor. The US cities are spread over a large geographic area, and it is unlikely for fallout to contaminate a large proportion of them, even in a heavy attack. Furthermore, our agriculturally productive regions are vast. Certain portions may be interdicted – perhaps for many

generations – but there will still be plenty of safe land left. Unfortunately for Mexico, a single attack can simultaneously deposit heavy fallout on most of your major cities, and blanket your entire agricultural region with fallout. Not only would your present population be largely wiped out, but the survivors would likely die or suffer genetic damage if they raised food on the contaminated land. As you can see, it is Mexico's long narrow shape that makes you so vulnerable. In fact, you are substantially vulnerable even in the event of a countervalue attack, if the wind currents are not favorable, but not to the same extent as in a counterforce attack."

Juan felt sick. He wanted not to believe what he saw and heard. His country was an innocent pawn in the US-Russia power struggle. The implications of these results were profound. There was a nonnegligible chance that his country would be essentially exterminated. He had to be sure. "These results are very impressive," he acknowledged, "but what can you tell me about the physical and mathematical assumptions that underlie the computations?"

Jack pulled two documents from his bookcase. One was called *The Effects of Nuclear Weapons*. It was a US government publication. The other was a research paper.

"*The Effects of Nuclear Weapons* describes the effects of fallout in detail," Jack explained as he turned the pages of the book to the appropriate section. "The physical theory is based on hundreds of thermonuclear tests in the Pacific and the southwestern US. Actually, the fallout levels in any actual attack will probably be worse than predicted in the *Effects* manual, because most of the atomic tests were set up to minimize the level of fallout. In fact, one of the reasons why attention to fallout hazards appears to have essentially disappeared is the fact that it did not seem very likely in the early sixties that any enemy would utilize a large number of surface bursts. In recent years, however, the aiming precision of the Russian missiles has

increased to the point where a ground burst weapon targeted at a hardened site has a good chance of destroying it. This realization was in fact the rationale for the MX system. What the defense planners evidently forgot – or chose to ignore – is that, under these conditions, the threat from radioactive fallout can no longer be ignored.”

Jack continued, “This other paper is one I wrote years ago on ballistic missile defense strategies. It analyzes in detail the basic offense/defense strategy – a subtractive overlapping-island defense with imperfect defenses and an imperfect knowledge of the attack size. You can examine the mathematics in detail. You’ll find it quite correct,” Jack laughed.

Jack handed the paper to Juan. Juan leafed through it. It was highly technical. Jack continued, “The optimization scheme that is used is the method of Generalized Lagrange Multipliers. This scheme is the basis for solving virtually all large-scale weapons allocation problems. It is an extremely powerful technique for solving complex optimization problems that do not satisfy regularity conditions such as linearity or convexity. You can read about the technique in several issues of the journal, *Operations Research*, published in the early 1960s.”

“The rest of the program is simple tallying – once an attack is specified, the fallout patterns are determined by the wind patterns and topography. I’m afraid I don’t have any documentation on the program itself. I’d rather not give you a listing in case I get back in the weapon systems analysis business some day. I’d have a useful proprietary computer program for micro damage assessment.”

Juan was satisfied. This man knew what he was talking about. The threat was real. The only problem that remained was what to do about it.

“Of course I would not expect you to give me your program,” Juan responded. But could I borrow the *Effects* manual and your paper?” he asked.

“The *Effects* manual may be out of print – as you can see, it was published in 1962. I would prefer to hold on to it – it’s my only copy. You may of course have a copy of my *Subtractive Defense* paper. By the way, you could certainly have the University of New Mexico borrow a copy of the *Effects* manual from the national laboratory at Los Alamos,” Jack replied.

“Also, let me give you a printout of these results,” Jack continued. He pressed several buttons on the console, and the printer reproduced the image that was on the screen.

With that, Jack had evidently concluded his demonstration and discourse. Juan expressed his sincere appreciation at the time and trouble Jack had expended on his behalf. Jack closed up and they left the office. It was late in the afternoon. As they drove back to Jack’s house in the foothills east of town, Juan was unusually silent as he pondered the events of the day.

When they reached Jack’s house, Jack invited Juan to stay for supper, and, moreover, to stay the night before returning to Las Cruces. Juan appreciated the offer, and he accepted. They spent the remainder of the afternoon relaxing around Jack’s pool. The scene of the sun setting in the west was striking. It was a day Juan would not soon forget, if ever.

At supper, Juan asked Jack what Mexico might do to minimize the damage in the event of an attack. Jack commented, “Not a hell of a lot, I’m afraid. As you saw, the impact on Mexico is largely a function of the nature and timing of the attack, which is controlled mainly by the Russians, assuming that the US does not attack first. The defensive capability and strategy is the next most important factor, and it would no doubt be optimized for the US. Maybe the US and Mexico could work out a joint defensive strategy. But a major factor in the current defense strategy is the MX system, and it is unlikely that the US will dismantle it for Mexico. As you are aware, however, the US is increasingly dependent on Mexico oil and gas. Your country may be in a position to apply some leverage in that area,” Jack conjectured.

After supper, Juan was tired, and he retired early. He expressed his thanks to Jack, and said that he'd be leaving early in the morning, probably before Jack was up. Juan spent a largely sleepless night, mulling over the grave situation.

The next morning, Juan returned home. As he drove back, he was overwhelmed by a deep sense of indignation and anger concerning the tenuous situation, which faced his country and people. The US was willing to sacrifice Mexico to protect itself, without so much as a warning, even a comment. As a final humiliation, the very states concerned – to which the US was “drawing fire” – had once been an integral part of Mexico. As a Mexican, he felt a keen sense of outrage on behalf of both parts of his dual heritage – his Spanish heritage and his Indian heritage. It was a double rape – the intentional destruction of lands taken from Mexico, and the final act of genocide against the American Indian.

He smiled wryly at the recent demonstration of the Indians against the defiling of their land by the white man, in his search for uranium in the US Southwest. If only they knew. They were objecting to minor “pilferage,” not suspecting for a moment that the crime being perpetrated was murder.

The drive back home passed almost without notice, he was so preoccupied with this monstrous problem.

He reflected on his brother and his brother's family in Chihuahua province. They lay in the path of the destruction. His sister-in-law, his nieces, his brother – all would be unsuspecting victims of this holocaust. Poor Raúl – worried about losing a few hectares of land, when he was about to lose his entire gene pool!

Sunday evening and Monday, he racked his brain, determined to find a solution to this problem. Late Monday, he resolved that he must inform the Mexican government at once of the situation. He placed a call to the President's secretary, and set up an appointment for the following Monday.

VII. DAMAGE ASSESSMENT

The following Sunday, Juan left for Mexico City. He took the plane. No longer was he in the mood for a leisurely drive over the countryside; there was now an urgency to his mission. On the plane, he sat next to the window. The sky was clear, and he could see the ground below. As he flew over the countryside, he reflected on how peaceful the land appeared from the high vantage point of the airplane. Like a sleeping giant, he imagined – or more like a sleeping woman unsuspecting a cruel assault in the night.

It was after dark when he landed at Benito Juarez International Airport. He picked up his luggage, and cleared immigration and customs. In his preoccupation, he had neglected to make hotel reservations. He had friends here who would be pleased to have him visit, but he was in no mood for small talk. He called a hotel near the capital and reserved a room for the night. He hailed a cab and headed for the hotel.

The next morning, he took a taxi to the President's office. He arrived early – about 9:30 – and announced his appointment. Promptly at ten o'clock he was ushered in to see the President.

In his role as a member of the Chamber of Deputies, Juan had met the President on several official occasions. The President was a tough-minded, hard-driving, no-nonsense man with a purpose. He was fiercely proud of Mexico. He viewed Mexico's large – but finite – petroleum reserves as a vehicle to bring his country into the mainstream of the industrialized world. He viewed the population crisis as one of the major threats to the future well being of Mexico, and had challenged the Church head-on with an ambitious program of population planning / birth control. He had set up ambitious development programs in the areas of education, infrastructure, and, most of all,

industrialization. Although he was firmly committed to the philosophy that the people who tilled the soil should own it, he recognized that there were now simply too many peasants for all of them to own land. In the realization that land ownership for all peasants was a hopeless objective, given the current population level, he had drawn the brakes on land reform and was pressing for alternative employment alternatives.

The President was openly resentful of the United States. He resented the losses of Mexican land in the past to the US. He resented the shabby treatment of Mexican agricultural workers as common criminals. And he resented the blatant air of superiority that the North Americans held toward his people. Juan reflected that he would “flip” – as the Americans put it – when he heard what Juan was about to tell him.

“Mr. President,” Juan began. “I appreciate your receiving me on such short notice.”

“I am always at the disposal of men such as yourself who are in service to our country,” the President replied. “What brings you here today?”

“Well, your excellency, in August I accepted a post as a visiting professor of agronomy at New Mexico University,” Juan began.

“I see. Cross-pollination is as beneficial in academia as in the field,” the President remarked, maintaining a formal air.

“During my brief stay in the US, I have come across some disturbing information that indicates that, in the event of a nuclear attack on the US, there is a possibility that Mexico could be destroyed.”

“What?” the President laughed, obviously not accepting Juan’s assertion. “How can this be?” he asked rhetorically. “The Russians will be attacking the US, not Mexico.”

“The threat isn’t from the weapon blasts,” Juan explained. “It’s from the radioactive fallout from the nuclear detonations. While we have evidently always been subject to some danger, the level

of danger has increased markedly with the deployment of the MX defensive missile system in the US Southwest.”

The president’s interest heightened considerably. “Why do you believe this situation to be dangerous for Mexico?” he asked.

“Well, if the Russians attack first, they will attempt to destroy the MX system. This requires a very large number of weapons because, as you may be aware, there are a large number of unoccupied missile sites in the system, and the Russians will not know which ones contain missiles. The system has the effect of drawing fire toward Mexico, in numbers far in excess of the number of defensive missiles. What makes the situation so dangerous is that, in order to destroy a missile site, a direct hit is required – a “surface burst” in the terminology of weapon systems analysis. Unfortunately, however, surface bursts generate large amounts of radioactive fallout. As you may be aware, radioactive fallout can spread for hundreds or thousands of kilometers from the blast site. I have seen the results of analysis that indicate that the levels of fallout can be of such intensity as to effectively destroy Mexico by killing much of our population and destroying our agricultural system, since the food produced on contaminated fields would be unsafe for consumption,” Juan concluded.

The President was obviously concerned, but still skeptical. “What about the US itself? They would not have designed a missile system that would cause this much damage to themselves. They would surely be hurt more than we,” he asked.

“Well, I’m not an expert in nuclear warfare,” Juan continued, “but you will observe that the MX system is deployed in the least valuable part of the US, from the point of view of their agriculture, industry, and population. I would assume that Washington decided that it was all right to sacrifice a few Indians and Mexicans – and a few of their own farmers, to be sure – to enhance the survival of the rest of the country. It’s just like their testing nuclear devices in the southwestern US, and dumping nuclear waste there.”

The President's eyes flashed with anger at this observation. Juan had hit a nerve. The President resented the relationship between the US and Mexico anyway. The thought that they might endanger his country – much less sacrifice it – caused the anger to well within him. “If what you say is true,” he began, “we indeed have a serious situation. But how did you come by this information?” he asked.

Juan explained to him the sequence of events that had led to his knowledge of the situation. He concluded his discussion by handing the President the printout that Jack had given him, showing the damage to Mexico. The President appeared to regard the information as credible.

“This appears to be a serious situation,” the President remarked. “I want Gen. Ramirez, Chief of Staff, to review what you have told me.” He pressed a button on his office intercom, and asked an aide to ask Gen. Ramirez to come to his office right away.

While Juan and the President waited for Ramirez' arrival, the impact of what Juan had related began to take its full effect on the President. He vented his anger at the US. “First, they steal half our country, but they still can't be satisfied. Now they wish to destroy us completely!” He was furious. This was the final humiliation. “The bastards! Why have they not at least warned us of the danger? We are human beings, too!” The President seemed no longer to question the verity of the information Juan had relayed. If there were the slightest chance of the damage materializing – and the arguments were sufficiently plausible that this chance could not be nonexistent – the potential consequences were so ominous to Mexico that the magnitude of the callous disregard of the US for Mexico's welfare assumed monstrous proportions. Juan knew how the President felt – he himself had experienced the same reaction. It is not possible to maintain an extreme level of rage/humiliation for long, however, and Juan's appreciation of the situation was now at an intellectual

rather than an emotional level. His concern was no longer for the rightness or wrongness of the situation – only for what should be done in response to it.

After a short time, the General arrived. The President introduced him to Juan, and began himself to explain the situation. As he finished the explanation, he looked straight at the General and asked him, “What’s going on, General!”

The General was obviously on the defensive. If the threat were true, he evidently was not aware of it, and hence not doing his job. His immediate reaction, unfortunately, was to reject the hypothesis. “I have seen fallout maps corresponding to a full-scale attack on the US,” he replied. “The prevailing winds are easterly, not southerly. The fallout blows to the east, across the US. The damage to Mexico is minimal.”

The President turned to Juan, raising his eyebrows in a half-questioning, half-expecting fashion.

Juan explained. “I know what you are referring to. I myself have seen the wind vector charts on seasonal charts, depicting – as you correctly put it – the *prevailing* wind, or *average* wind direction. The point is, however, that on some days the winds blow toward Mexico, and if an attack occurs on such a day, we are lost.”

The General’s initial defensive reaction may have been foolish, but he was not a stupid man. He realized at once what Juan was talking about. He accepted Juan’s explanation. His attitude switched from defensiveness to inquisitiveness.

“Tell me more about the man who gave you this information. If the information were correct, it would be classified by the US Department of Defense. What reason do we have to believe that the analysis is correct?” he asked.

Juan told the General about Jack’s experience in weapon systems analysis in the 1960s, about his credentials, and about the way in which he came to conduct the recent analysis. The General was impressed. He turned to the President, and said, “I

am afraid, sir, that there may very well be something to this argument, and Mexico could in fact be in danger. We have relied heavily on nuclear weapons effects information provided to us by the US government, and it has been highly sanitized. We evidently need to explore the situation more deeply.”

The three men discussed what could be done to obtain more information – both further verification of the threat, and more elaborate information on the nature of the threat. Juan reasoned that since Jack had a substantial amount of experience in weapon systems analysis, there was virtually no chance that his computations were ill grounded. His work in the 1960s would have been subject to review and comment by other weapon systems professionals, and it was Juan’s belief that the US weapon systems community included America’s finest scientists.

The only other possibility was that Jack was lying. This seemed impossible to accept for several reasons. First, Jack was an established scientist who would surely not jeopardize his career; second, Juan had talked with the man for a reasonably long time, and was convinced of his sincerity; third, his motives for having conducted the analysis in the first place – his own personal safety in Tucson – were completely believable; fourth, he was not “promoting” his hypothesis for personal gain – he had evidently mentioned it in a somewhat casual fashion to his acquaintances. No, there was no question of his sincerity, or of his capability.

The President asked if Juan could get Jack to conduct some additional analysis, to reveal the full nature of the threat to Mexico. Gen. Ramirez interrupted that Campbell was a foreign national – his results could not be used as a credible basis for Mexican defense planning. The President asked Gen. Ramirez what in-house capabilities Mexico had in nuclear weapon systems analysis. The General slumped in his chair. The President turned to Juan.

“Sr. Carrera,” he began, “can you approach Dr. Campbell and ask him to conduct these further analyses? We would of course pay him for the work.”

Gen. Ramirez interrupted, “If you tell him it’s for a foreign government, he won’t do it – he’s a US citizen!”

Juan protested, “I see no apparent loss in the US defense posture from what Jack has already told us, and I am sure he views it the same way or else he would not have told others of his results. I have no reason to believe that he is not a loyal US citizen. What we are asking is simply more detail – more computer runs of exactly the same sort that he has already shown me.”

“Well,” the General interjected, “maybe you should tell him that you want the runs for your own personal use, rather than for the use by the Mexican government.”

Juan continued, “Jack is no fool. The first time I ask him for some elaboration on a point, at your request or the President’s request, he would sense that I was requesting the work for someone else, and be offended at the deception. No, I must be open with the man. If he refuses, he refuses.”

The President added, “I agree with your assessment. Do what you can to elicit his assistance. Also,” he continued, “I am today setting up a special secret commission to investigate this threat, and to develop a Mexican response to it. I want you, Dr. Carrera, to head this commission. I will put at your disposal whatever resources are required to assess the threat, and – if it is real – to respond to it. I want the finest Mexican intellectual talent working on this effort. I know that you will accept this responsibility.”

Juan was taken aback. The President was decisive. Several thoughts flashed through his mind. First, he was an agronomist, not an operations researcher. Nor was he familiar with weapons effects. Nor was he an administrator. But if someone else were to do the job, would it be done more correctly? Maybe they would draw the wrong conclusions. He must accept.

“I am honored, your Excellency,” Juan replied. “But are you sure that I am the best man for this job?” he asked, more by way of seeking confirmation than reassessment.

“I want you to handle it,” the President responded. “Gen. Ramirez, will you support Dr. Carrera in every way possible in his mission?” The President had evidently posed this order as a question to elicit an affirmation from the General, since his decision to form the commission obviously usurped some of the military’s implicit responsibility, in fact if not in law.

“Of course, your Excellency,” Gen. Ramirez responded. Juan sensed that he was uncomfortable, but sincere. Perhaps he realized that he didn’t have the technical talent available to do the job. Or maybe he suspected a major screw-up, and he would just as well have someone else take it on the chin. Or maybe he appreciated Juan’s having discovered the threat. In any case, Juan believed that he would not encounter resistance from the General.

“I will greatly appreciate your help in the matter, Gen. Ramirez,” Juan stated. “Although I believe that I can obtain much useful information from Dr. Campbell, I will be very dependent on you for advice and support.”

“I will be happy to assist you however I can,” Ramirez responded.

With that, the discussion was essentially over. The three men discussed some details, such as expected schedules and the procedure for contracting with Dr. Campbell. The President called in his aide, and asked her to set up a special account in favor of Dr. Carrera. They agreed to meet again as soon as Juan had received more information, but in any event within a month.

The three men parted. Juan headed to the airport, and back to El Paso. As he flew, he reflected at how successful his mission had been. At first he marveled at his apparent ability to control the situation. Upon reflection, however, he decided that it was the

enormity of the threat that was so compelling, rather than his own personal charisma.

It was late in the day when Juan reached home. His next step was to get in touch with Jack Campbell to see if Jack would do the analysis he needed. First, however, he must decide specifically what to request of Jack. He recognized that Jack would know better than he what specific computer runs should be conducted to characterize the nature of the threat to Mexico, but he would attempt to identify the general requirements himself.

Juan decided that there were two different kinds of information that he needed. First, he wanted a detailed explanation of the model and its underlying assumptions. Although Jack had expressed a reluctance to release his computer program, he evidently had no objection to describing the mathematical premises on which it was based. Second, he wanted the results of a number of simulations of the damage resulting from nuclear attacks on the US. These simulations should be run under a variety of assumptions about the nature of the attack, weather and wind conditions, and the like. Jack would no doubt be able to specify a reasonable range of assumptions.

After mulling over the analysis he wanted, he dialed Jack's number. It was evening, and so he called Jack at home. Jack was in, and in a friendly gesture expressed his pleasure in hearing from Juan. Juan was direct in his proposal to Jack. He said that as a result of his former role as a member of the Mexican Chamber of Deputies he had access to the funds to investigate matters of political concern to his constituency and the country. He did not, of course, mention the fact that he was now in charge of a secret commission. He expressed his considerable concern over the matter, and his desire to obtain more specific information about the threat. Specifically, he indicated that he wanted to contract with Jack to conduct a detailed damage assessment.

Juan finished his proposal, and asked Jack if he would do the job. There was a silence on the line. Juan wondered whether Gen. Ramirez had been right. Had he been mistaken in being so forthright with Jack? As these thoughts and second thoughts raced through Juan's mind, Jack finally responded.

"Why, yes," Jack replied. "I believe I could do that. In fact, I have consulted a few times in the past to foreign governments in the area of economic planning and development. Quite frankly, the long-term benefits from the work you suggest might far exceed the value of the economic development work I've done."

To put it mildly, Juan was relieved. He sketched out to Jack what he thought was wanted. Jack understood exactly what he wanted, and suggested a few specific runs of interest right away. Jack said that his schedule was somewhat flexible over the next few weeks, and that he would be able to get to work right away.

They decided on a "Time and Materials" contract as the basis for Jack's work. He said that he could send Juan a copy of his standard T&M contract for signing. He indicated, however, that contracts with foreign governments were viewed as bad risks in his business, and – no offense to Juan – he would have to insist on a Letter of Credit, drawn to the order of a US bank, to cover at least \$25,000 of the contract costs.

Three weeks later, Juan had his results. Jack was a real professional. He had presented his results in a bound report that clearly presented his objectives, assumptions, findings, and conclusions. He had included the various computer simulation runs in appendices to the report.

The report included a succinct summary of the results, showing what the overall level of damage to Mexico was under various attack conditions (see Figure 1). The report referred to a "LO" level of damage as one in which less than 10% of the Mexico population were killed; to a "MOD" level of damage as one in which between 10% and 50% of the population were killed; and to

a “HI” level of damage as one in which 50-100% of the population were killed.

Figure 1. Summary of Damage to Mexico Resulting from Nuclear Attacks on the US – <u>No</u> Targets in Mexico (table entries refer to population casualties)				
Strike Order <u>1/</u>	US First Strike		US Second Strike	
Wind Conditions <u>2/</u>	Favorable	Unfavorable	Favorable	Unfavorable
MX Status <u>3/</u>				
No MX	LO	LO	LO	MOD
MX	LO	LO	LO	HI
<p><u>1/</u> “US First Strike” means the US attacks Russia first; “US Second Strike” means Russia attacks the US first.</p> <p><u>2/</u> “Favorable Wind Conditions” denotes that the upper atmospheric wind vectors in the southwestern US are not blowing in a southerly direction, toward Mexico; “Unfavorable Wind Conditions” denotes that the upper atmospheric wind in the southwestern US is blowing toward Mexico.</p> <p><u>3/</u> “MX” refers to the situation in which the MX system is fully deployed; “No MX” refers to the situation in which the MX system does not exist, or is not located near Mexico.</p>				

Figure 2. Summary of Damage to Mexico Resulting from Nuclear Attacks on the US – <u>With</u> Targets in Mexico (table entries represent combined population casualties and industrial damage)		
Strike Order <u>1/</u>	US First Strike	US Second Strike

Wind Conditions <u>2/</u>	Favorable	Unfavorable	Favorable	Unfavorable
MX Status <u>3/</u>				
No MX	LO	LO	HI	HI
MX	LO	LO	HI	HI

1/ “US First Strike” means the US attacks Russia first; “US Second Strike” means Russia attacks the US first.

2/ “Favorable Wind Conditions” denotes that the upper atmospheric wind vectors in the southwestern US are not blowing in a southerly direction, toward Mexico; “Unfavorable Wind Conditions” denotes that the upper atmospheric wind in the southwestern US is blowing toward Mexico.

3/ “MX” refers to the situation in which the MX system is fully deployed; “No MX” refers to the situation in which the MX system does not exist, or is not located near Mexico.

In addition to the summary charts, of course, there were detailed tables that showed the expected number of “early” and “late” fallout casualties, the percentage of land interdicted for over 100 years by fallout, and the expected rate of genetic deformities and cancer that would occur if food from the contaminated regions were consumed.

Jack pointed out that most of his runs assumed that no points in Mexico were targeted. He noted that this was not a totally reasonable assumption. If Russia attacked the US with a “countervalue” attack, then they would very likely destroy Mexico’s oil and gas refineries and pipelines near the US border, and likely target the oil fields in the Isthmus even as well, since these installations contributed directly to the US industrial base.

Jack had made one “combination” run that took into account the value of Mexican petroleum to US industry. The results were substantially more damaging to Mexico (see Figure 2). One of

the reasons for the high level of damage was that it was assumed that US defense policy would defend US industrial targets with greater likelihood than Mexican targets.

Juan read with a particular interest the section describing the interdiction of Mexican agricultural regions by fallout. His brother's family would likely be killed as early fallout victims, from gamma and beta radiation. Even more horrifying from his people's viewpoint, however, was the number of genetic mutations and deformities and cancer cases that would occur in the future. The only way of avoiding these, Jack noted, was not to consume food from the contaminated areas. In this case, however, the number of "early" casualties was increased, because the country could no longer feed its population.

Juan read and reread the report with fascination. It represented an incredible, detailed description of what could happen and what was likely to happen in the event of a nuclear exchange between the US and Russia.

The message was clear. If Russia strikes the US first and the wind conditions are unfavorable, then Mexico may be destroyed from fallout from MX hits, even if no targets in Mexico are hit. Moreover, if Russia strikes first and decides to include Mexican targets as a means of crippling US industry by removing the energy source – Mexican oil – then Mexico is essentially destroyed as a people and an industrial power, forever.

Juan called the President, and informed him that he had the detailed results they had discussed earlier. The President asked if the results were as bad as expected. "Worse," Juan replied. They set up a meeting for the following Monday.

This time, in addition to Gen. Ramirez the President had asked two members of the Mexican Security Council to attend the meeting. Juan presented the results. When he had finished, the President asked for reactions. One of the members indicated that the US should be forced to dismantle the MX system; he argued that we could do this by denying the US access to Mexican oil

and gas. The other members of the council argued that this was probably a waste of time – the US could get it elsewhere, and would be willing to inconvenience itself to increase its chances of survival. He added, though, that if Mexico refused to sell oil to the US, then at least the Mexican oil fields might not be destroyed simply as a means of crippling US industry.

The arguments continued, but there were no conclusions. The problem was that there was no conceptual framework within which they could solve the problem. Juan finally suggested that they needed the advice of a strategist in attack countermeasures – someone who could identify a wide range of options, and analyze the implications of each.

The President picked up on this suggestion. Clearly, a group of laymen would never reach a consensus on the highly complex issues of ballistic missile warfare strategy. Once again, however, the issue of a lack of ready Mexican talent became apparent. With reluctance, the President asked Juan to convince Dr. Campbell to examine defense strategies that Mexico might consider with which to defend itself.

VIII. COUNTERMEASURES

The principal thesis of the field of sociobiology is that all behavior is genetically controlled, and that individual behavior tends to be conducted in such a fashion that the long-term survival of the gene pool of the individuals is maximized. It follows that only those principles of conduct and morality will be adopted which best assure the survival of the gene pool. Furthermore, if conditions change so that a particular standard of behavior is no longer in the best long-term-survival interests of the gene pool, then that standard invariably will eventually be modified, suspended, or abandoned. There are no absolute

standards of “morality” or “human rights” – only standards of behavior that promote the gene pool, and those that do not.

Juan returned to the US and contacted Jack. He told Jack that he had carefully read the first report and was quite convinced of the validity of Jack’s analysis. As comprehensive as it was in terms of assessing the threat to Mexico, however, the report did not go far enough. Juan explained that what he wanted, if Jack could provide it, was an identification of various countermeasures that Mexico might consider to minimize the threat or to minimize the damage in the event that the threat materialized.

Jack was quite interested – perhaps excited, it seemed to Juan – at the prospect of continuing the work to this next step. He explained that he had been heavily involved at one time in the analysis of radiological countermeasures, back in the days when the US was concerned for the welfare of its population in the aftermath of an attack. In fact, Jack went on to comment that more such work needed to be undertaken in the US itself. Present US policy, however, seemed to be that there was no point in saving population in numbers out of proportion to the industrial, agricultural, and transportation capacity that remains to support them – mass starvation would simply occur, in view of the US population’s dependence on mechanized agricultural production in areas quite far from population centers. Although there may be some logic in this line of reasoning for the US, Jack explained, it definitely did not apply to Mexico, where the primary threat was from radiological effects – not from direct blast effects.

Jack began the work right away. After a few more weeks, he had produced a sequel report to his first one. The second report exhibited the same fine logical presentation of the first one. After reading quickly through it, Juan contacted the President, and set up another meeting.

The meeting was held on Friday. It was attended by the same five individuals as before – the President, Gen. Ramirez, Juan,

and the two members of the Internal Security Council. Juan summarized Jack's results. In conducting his research, Jack had assumed a heavy attack on the US, and wind conditions that were unfavorable for Mexico. He had not, however, assumed that the MX system was present in every case. He argued that he viewed that the presence of this system was negotiable; whereas cities and targets could not feasibly be relocated, the MX system certainly could be, although at substantial cost.

Jack had separated the defensive countermeasures into two types – “Passive Countermeasures” and “Active Countermeasures.” Passive countermeasures included measures such as conversion of buildings into stocked fallout shelters, plowing of fields to reduce the amount of radiation incident on the workers, relocation of the Mexican center of government from Mexico City to a more southern location, and some dispersal of key Mexican industry to areas that had a reduced threat of radiation. Active countermeasures included actions taken by Mexico to alter the nature of the attack on the US or the defense of the US.

Jack had separated the active countermeasures into two categories – conventional and “exotic.” The former included relocation of the MX system, and assurance by the US that it would defend Mexico's energy (petroleum) system in the event of a nuclear attack. The latter – exotic countermeasures – included the execution of a joint mutual defense pact between the US and Mexico, under which the US would consider Mexico as US territory for defense purposes, and defend it in a manner consistent with its defense of its own country, and both countries would agree to support each other in the attack aftermath.

Jack obviously had been attracted to the “exotic” countermeasures, for he had conducted a rather thorough analysis of these measures. In his analysis of this situation, he had relaxed his assumption concerning the magnitude of the attack, and examined the joint US-Mexico defense case over a

range of attack sizes. In order to assess the feasibility of this concept, he had in fact determined three defense strategies – the “optimal US strategy” in which the US defended itself with no particular regard to Mexico; the “optimal Mexican” strategy, in which the US defended Mexico to the maximal extent, with no consideration to the US; and the “optimal combined US-Mexican” defense strategy, in which the two countries were considered as one for defense purposes.

Jack indicated that, for these analyses, he had departed radically from the standard analytical framework usually employed in ballistic missile defense strategy analysis, by dropping the “separability” assumption. In his report, he explained that most damage assessment methodology was based on simple “additive” payoff functions in which the “value” of each target was considered to be independent of the value of every other target. Although this approach was reasonable for light attacks, it was not reasonable for heavy attacks, because of the interdependence of the US economy. The problem that arose was that if the inputs of an industry or sector of the economy were geographically dispersed, and some of the key inputs were destroyed in the attack, then that entire industry was effectively destroyed. Jack noted that dispersal of industry was a good countermeasure only if each dispersed component was completely vertically integrated, and could operate in the absence of the other components.

In order to address the problem of industrial/sectoral interdependence, Jack had formulated an entirely new payoff function. He explained that he had incorporated an input-output model of the US and Mexican economies into his defense model, that explicitly recognized the interdependence of the US and Mexican targets. With the incorporation of this model, Jack could determine defense strategies that took into full account the sectoral dependence, and obtain much better estimates of the true value of the remaining productive capacity.

In his report, Jack explained that there was a very interesting and significant consequence that resulted from this extension of the methodology. It turned out that, under a heavy attack, the optimal defense strategies for the US and Mexico were quite different! The US optimal defense strategy saved targets that were highly integrated – i.e., economic units that had sufficient agricultural, industrial, and population resources to support themselves independently after a heavy attack. It allowed for the virtual total destruction of nonintegrated targets.

The Mexican optimal defense strategy, on the other hand, was totally different. Because few Mexican locations were targeted, much of the population, industry, agriculture, and infrastructure would remain, assuming no unfavorable wind conditions. In this case, however, the dependence of the Mexican economy on external economies came into play. What happened was that a heavy attack on the US resulted in the occurrence of several “gaps” in the Mexican economic structure. For example, after the attack Mexico would have no capability in high-technology areas such as aircraft production, computer technology, and nuclear energy. To reduce these gaps, the optimal defense from Mexico’s viewpoint centered on saving these few specialized components in the US economy. Because these components were sure to be heavily targeted, however, their defense consumed substantial defense resources, possibly resulting in substantially heavier damage to the US overall than would have occurred in the “optimal US” defense.

In summary, Jack concluded that since the optimal US and optimal Mexico defenses were quite different, it would take considerable pressure on the US to agree to a joint mutual defense pact of the sort that he had conjectured.

Juan finished his presentation, and turned to the President. “Well,” he asked, “what do you think?”

The President had a distant look on his face. He did not respond to Juan’s question right away. After a long silence, he

began to speak, in a slow, measured, and considered fashion, that was not his usual manner.

“I think,” he began, “that we should not be so much concerned with our defense.”

Juan was startled. Had the President missed the profound implications of what he had said? “What do you mean? *We must* defend ourselves!”

“I mean that we must *remove* this threat to our people,” the President responded, in slow, measured tones.

“But how can we possibly do this?” Juan demanded. “We are mere pawns in a battle of giants. There is little we can do.”

“We must remove this threat,” the President reiterated, in the same definitive fashion as before.

Juan got the distinct impression that the President had a definite plan in mind. He asked again, “What are you proposing, Mr. President?”

“I am proposing,” he began, “that we take *whatever* measures are required to assure the safety and well-being of our people and our country – to the extent of precipitating a preemptive attack on Russia, and modification of US defense strategies by espionage, if necessary.”

The room fell silent. A chill ran over Juan, causing the hair to rise on his shoulders and arms. At first he thought the President was mad. What civilized man could propose such an action! He groped for words.

“I...uh...” he hesitated, and then clumsily responded, “Is this the right thing to do?”

The President’s demeanor changed. He rose from his seat and leaned over the desk. He pounded the desktop with a single, decisive blow. “Of *course* it is, man! Would you stand by and watch your wife raped and murdered? The US has plundered half our land. They humiliate our people daily. They have placed this defensive monster at our doorstep to save their own skins while our people – in Mexico and in the US Southwest – will perish. We

mean even less to Russia. We must destroy this monster, before it destroys us. Our people *must* survive!”

Juan was stunned. There was fire in the President’s eyes. He meant every word he said. As the President spoke, however, he found himself recalling his own feelings of anger, frustration, and humiliation of several weeks ago. He had gotten wrapped up in the intellectual exercise of looking for a rock to hide behind, when the situation demanded instead a swift and deadly response. The President was right! The country must take whatever steps were required to save itself. The US was prepared to sacrifice all of Mexico to save a few more Americans. It would be foolish – no, it would be a desecration of his own people, ancestors, and descendents – not to defend themselves by all possible means.

“You’re right,” Juan responded. For a moment, his heart welled with pride. This man, the leader of his nation, had vision – vision that would save his people from destruction. Juan looked at the other members of the meeting. They had been silenced, as had he, by the impact of the President’s words. Now, they began to speak. They agreed. Their people must be saved, above all other considerations.

IX. LONG RANGE PLANS

Preface

On the issue of leadership, the tenets of sociobiology are clear. Individuals will generally rally behind a leader in support of a cause that promotes the long-term survival or development of their gene pool, and they will surely rally behind a leader in response to a situation in which the long-term survival of their gene pool is seriously threatened.

The remainder of the meeting was devoted to setting up a structure in which the mission at hand could be accomplished. One thing was clear: the task would require a massive effort. On the other hand, its chances for success would be seriously jeopardized if the secrecy of the mission were compromised. The President decided to use the Commission headed by Juan as the vehicle for undertaking the mission.

The President asked Juan to continue in his role as head of the Commission. He would place at the Commission's disposal whatever resources were required to do the job. He said that it was obviously no longer in the best interest of the course of action to involve further participation by Dr. Campbell. Juan agreed. They would have to obtain or develop a Mexican capability in the areas of strategic and tactical nuclear warfare. The country's capabilities in economic planning must be strengthened, and oriented toward the demands of a postattack environment. Mexico's espionage capabilities must be developed from the point of a passive information-collection system to an active system capable of accomplishing manipulation of the US offensive and defensive strategies.

The teaching semester at the university was ending, and Juan returned once more to the US, to wrap up his assignment there. His teaching position was no longer of any relevance in the context of his current mission, but he had decided that it was in the best interest of security to end his contact with Jack in a "normal" fashion. He told Jack that he appreciated his work very much, and that the Mexican government would no doubt consider the various options that Jack had identified.

Juan structured his Commission into four components – the "Defense Planning" component, which determined what defensive and offensive strategies should be developed to maximize the economic and social survival of Mexico; the "Tactical Operations" component, which was responsible for precipitating a first strike on Russia at the optimal time, and for modifying the US tactical

defense strategy to maximize the survival of Mexican interests in the ensuing nuclear exchange; the “Preattack Development” component, which was concerned with the development of those resources and capabilities which would be required to assure a smooth entry into the postattack situation; and the “Postattack Operations” component, which was concerned with the deployment of a social/political/economic capability for operating the country in the postattack environment.

The four components were, of course, interdependent, but the types of personnel they required and the nature of the activities conducted by them were sufficiently different to warrant their organizational separation. The Defense Planning component required experts in national economic planning and ballistic missile warfare; the Tactical Operations component was an espionage function; the Preattack Development component required experts in organization development; and the Postattack Operations component required experts in conventional military operations and civil government.

The Commission’s work proceeded smoothly, but slowly. The most difficult job, of course, was obtaining the right people. They had to be bright, knowledgeable, and motivated. Recruiting them was awkward, in view of the fact that Juan could not tell them the true nature of the mission until they had been cleared at that highest security level, and accepted the job. In the interest of security, and in order to be able to talk at all meaningfully with prospective candidates for membership, Juan quickly renamed the Commission and its four components. The Commission was to be called the National Economic Development Authority, or NEDA; the Defense Planning Component was renamed the Economic Planning Component; the Tactical Operations Component was renamed the Internal Security Component; the Preattack Development component was renamed the Economic Development Component; and the Postattack Operations component was renamed the Disaster Mobilization component.

The first order of business for the Commission was the development of a draft plan of operations. The plan was formally called the Three-Year Economic Development Plan, or the “Three Year Plan” for short. It was developed by Juan and the head of each component of the Commission. The group worked long and hard on the draft plan. It provided a three-year timetable of steps to be taken to precipitate the exchange, and to place Mexico in a position to respond in the event that some damage were incurred directly by Mexico.

When the draft plan was completed, it was submitted to the President for review. After he had had the plan for a week, the President called Juan for a meeting. As Juan entered the President’s office, he could sense that the plan had not been well received. But what could be wrong? The plan was too well thought out. The strategies were well founded, and the implementation plans were feasible. He had considered every contingency – not only the planned scenario – a US first strike, favorable wind conditions, defense optimized for Mexico, and the like – but unplanned contingencies as well – a US second strike, an attack “too soon” for Mexico to implement its plans, heavy damage to Mexico, and the like. Where could he have failed?

The President was not a man to beat around the bush. As soon as they had exchanged pleasantries and Juan had been seated, the President simply said, “This plan won’t do.”

While Juan’s immediate reaction was to defend the plan, he suppressed his response, and asked, “What is the Problem, Mr. President?”

“It is a defense plan. It outlines what Mexico should do to preserve our ‘current assets.’ In the aftermath of a large-scale nuclear exchange between the US and Russia, however, the world will be in turmoil. Lord knows what will happen!” he exclaimed. “Russia will no doubt be destroyed. The US may well be destroyed. The Russians will no doubt not limit their response to the US. Western Europe will likely be destroyed, as will China.

In your plan, we simply close up our borders and ignore the rest of the world. That is not acceptable. Out of the destruction, we must come forth and take charge of our destiny. Cristobal Colombo claimed North America and South America for Spain. Our Indian forebears settled these continents 10,000 years ago. Our people have first rights to this land, and a responsibility to protect and develop it. When the war comes, Mexico must be prepared to assume its responsibility as the new world leader. Call it the Aztec Empire, the Spanish Empire, or the Mexican Empire, as you like. But in any case, this is a challenge and a responsibility that we cannot avoid,” the President continued.

There was an enthusiasm and drive in that man that was contagious. Juan listened in fascination as he continued. “I want you to develop a new plan – an offensive plan, that implements our rightful destiny. If it takes more time, take it. If it takes more resources, use them. Do whatever is required, but whatever you do, don’t limit our horizons.”

Once again, Juan was taken by the vision of this man. As they talked, he reflected that he – Juan – was a technician. He could analyze a problem and develop a good solution. But he lacked the vision to define the right problem to address. His people were indeed fortunate to have this man at the helm.

They concluded their meeting, and Juan returned to the NEDA office. He had been inspired by the President’s talk. He would begin to develop a new plan that was worthy of the President’s vision.

Juan and the other members of the planning council worked for month on the revised plan. It was vastly more comprehensive in scope and detail than the earlier plan had been. Moreover, it was clear that more time was required to bring Mexico to the state of development that was required to assume command after the exchange. The plan was extended to five years.

The Five Year Plan was a masterpiece of development strategy. First, it addressed all sectors of society and the

economy. It identified the strengths and weaknesses of each sector, and identified those sectoral inputs that were heavily dependent on the US economy. The Plan then proposed a means for developing these parts of the Mexican economy, or, in those cases for which time or resources were not sufficient, it determined what features needed to be incorporated into the US defense strategy to assure the survival of these components.

One of the principal areas of concern in the Plan was energy. The key issue to be addressed was how to plan for the eventual depletion of the Mexican – and world – petroleum reserves, in a few decades. This problem generated considerable controversy. In the end, it was decided that nuclear energy was the only feasible solution. Since nuclear fission was totally infeasible as a long-range source because of the large amounts of slow-decay radioactive waste it generated, it was decided that nuclear fusion would have to be developed – a perfectly clean and limitless supply of energy. The technical feasibility of fusion had been demonstrated at Princeton University in 1978, and it was estimated that this technology could be developed on a large scale within a few decades. In order to accomplish this, however, Mexico had to save the US fusion technology from destruction, and development of a means for accomplishing this was identified as a high-priority item.

During the interim period in which the fusion technology was being developed, the Plan called for careful use of Mexico's petroleum reserves for heavy industrial purposes, coupled with a strong solar energy program for areas within forty degrees of the equator for domestic, agricultural, and small-scale industry use.

For monitoring of contaminated agricultural areas in the US (or Mexico) after the attack, Mexico needed to produce a very large number of Geiger-Müller counters. Also, the Plan called for the production of a large number of shielded tractors, for plowing of mildly contaminated fields. An argument arose over who would receive the contaminated foodstuffs raised in those lands, and

how to address the high levels of genetic damage and birth defects that would result. A thorough program of genetic birth defect screening of all fetuses and newborns was regarded as necessary to avoid the possible consequence of biological collapse from a defective gene pool.

For defense purposes, Mexican industry was to be highly dispersed. Also, it was decided to develop three centers of government, any one of which would operate the nation in the event of the destruction of the other two. One was the current capital; one was to be located in the South, far from the radiation threat; and one was to be highly mobile to avoid the threat of targeting.

The Mexican armed forces were to be vastly expanded, to assume their role in the immediate postattack period. Also, administrative civil units were designed, to take over the administration of acquired cities and regions in the US and other countries.

To enable a smooth acquisition of the US Southwest, it was decided to continue development of the Mexican supply of oil and gas to the US, with a system of border-crossing pipelines. Because of the large number of resident Spanish-speaking persons and Indians, the integration of the southwestern US into Mexico was regarded as an easy and important objective, and it was given considerable attention.

When the revised Plan was completed, it was submitted to the President for his review. He was very satisfied. He commented that the Plan was quite consistent with his views, and had identified and considered aspects of the situation that had not occurred to him.

Over the next several years, Juan, the Commission and the nation became immersed in the implementation of the Plan. After a while, Juan realized that in spite of the fact that the original motivation and direction of the Plan had been the threat of a

nuclear exchange, the Plan could have been justified solely on the basis of its economic benefits and economic efficiency. Eventually, the nation reached the point at which it was ready for the next phase of the process toward which it was inexorably driven.

X. LANDING A JOB

Cheyenne Mountain, Colorado Springs, Colorado...

“Tell me a little about yourself, Miss Mirenda,” Col. Jamison asked. “Where you’re from, where you went to school, what you studied, previous experience, and so on. I’ve glanced over your résumé, but I always like to hear what’s between the lines, so to speak.”

Carmen took a sip of the coffee that Col. Jamison had offered her, and began. “Well, Col. Jamison, I was raised on a farm just outside of El Paso, Texas. After graduation from high school, I attended college in Arizona. I began my studies as a physics major, but switched to mathematics in my junior year.”

“Why did you change fields?” Jamison interrupted. He smiled broadly as he asked his questions. His eyes glanced from her eyes to her crossed legs and back to her eyes as he spoke. He didn’t mind letting her know that he was “looking her over.” Lecherous bastard, she thought. Probably has a wife and three kids at home.

But then again, by any standards, she was a knockout – not the run-of-the-mill female scientist. And she was particularly well dressed and coiffed for her interview. She was wearing a white long-sleeved blouse with ruffles down the front, a navy-colored straight skirt, and navy pumps. Her only jewelry was a wristwatch on her left wrist and several solid gold bangles on her right wrist. Her dark complexion contrasted sharply against the white blouse.

Her black hair was pulled back in a style that emphasized her haughty Spanish demeanor. She had a good figure, which was accentuated by the close-fitting skirt and blouse. If he hadn't noticed her, she decided, he would hardly have qualified as a man.

"Well, I was enamored of the fact that mathematics is the basis for all science, whether it's physics, engineering, psychology, or what have you," Carmen explained. "I worked the summer of my junior year as an aide to a statistician, and was quite struck by the 'power of numbers' in scientific investigation. Although I enjoyed science very much, I never really had been drawn to any particular field, and I enjoyed the general applicability of applied mathematics to all areas."

"I see that you received your master's degree in operations research," Jamison noted. "That's a fairly specialized field. How did you happen to pick OR?" he asked, still smiling broadly.

"In the summer after my senior year," Carmen responded, "I worked as a summer intern in the operations research division of the Institute. I got involved in a project in the area of statistical decision theory and game theory, and I became quite interested in optimization problems. Although I had initially enrolled in the statistics program, I decided after my first semester to take the MS program in OR, with a minor in Statistics, rather than vice versa. As you're aware, I am just now completing the program, and looking for an interesting position that can utilize my training."

"I see," Jamison nodded, still smiling his too-wide smile. "Why did you decide to contact NORAD (North American Air Defense Command)?" he asked. "What interest do you have in weapon systems work?"

Carmen reflected that, in spite of his apparent distraction, he could still carry on the interview effectively.

"As you may be aware, most of the really significant applications in the field of optimization and OR have been in the area of weapon-systems analysis," Carmen began. The large-

scale military systems and defense problems generate problems of a level of complexity and sophistication that is generally considerably beyond that found in private industry. Granted, there are some interesting process control problems in industry – but the really interesting problems, such as large-scale problems in game theory or sequential decision problems, definitely tend to be in military applications. If you’ll glance over the issues of *Operations Research* for the last two decades, you’ll see what I’m talking about.”

Col. Jamison sat up a little straighter, and assumed a more business-like demeanor. He evidently had decided that this woman knew what she was talking about. His questions continued, but they were more specifically directed to the match of her interests and qualifications to the requirements of the positions he had to fill.

The interview process continued throughout the day. Col. Jamison, the Director of Recruiting, set up interviews with eight senior staff members in the NORAD technical support section. The interviews went very well. Carmen’s background was in fact very well matched to the requirements of the job.

The NORAD facility was faced with the problem of determining optimal offensive and defensive strategies for full-scale nuclear war. And new problems were continually arising. The characteristics of the weapons, defense system components, and targets were constantly changing. The size and composition of the weapon inventories fluctuated, for the US, its allies, and its enemies. The characteristics of the targets – cities, defense installations, energy sources, and the like – were constantly changing, for both US and foreign targets. Finally, the strategies themselves were continually under review and subject to change – both the objectives and the constraints – in response to changes in the political climate.

What made these problems so intriguing from a theoretical viewpoint was their sheer complexity – time-sequential

incomplete-information nonzero sum games, nonconvex discontinuous payoff functions, multidimensional utility functions – the whole range of exceptions to the “regularity conditions” which applied to the standard algorithms used for solving optimization problems.

Furthermore, the large-scale aspect of the problems in and of itself virtually eliminated the applicability of any “canned” optimization procedures. Carmen had written her master’s thesis on the subject of optimization techniques with imperfect information, such as was the case when the attack size was unknown. Although she expressed ignorance of many of the specific weapon systems that were mentioned in her interviews, she demonstrated that she was quite able to handle herself with respect to the technical issues that arose. In several instances, she was aware of new techniques that the current staff had not covered in their schooling several years earlier.

At the end of the day, she met again with Col. Jamison. He was still very cordial, but he had dispensed with his wolfish grin. “The staff are very impressed with your background and knowledge, Miss Miranda. Although we make it a policy never to make offers on the spot, there is little doubt that one will be forthcoming. As you’re aware, all work here requires Top Secret and Q clearances. When – or I should say, if and when – we extend you an offer of employment, it cannot be finalized until you are cleared to those levels.”

“I see,” Carmen nodded. “When will you be letting me know formally whether I shall be receiving an offer, Col. Jamison?”

“Very soon – we are able to fill a position without the delay associated with ordinary civil service positions,” he continued. “By the way, I would appreciate it very much if you could tell me something about what other offers you are receiving. We want to be as competitive as we can.”

Carmen and Col. Jamison chatted for a while longer, and Col. Jamison drove her back to the airport personally. It appeared that she had landed the job.

Within two weeks, Carmen received an offer from NORAD. She couldn't help feeling excited. It represented a crucial milestone in her mission. Further, she was flattered by the terms of the offer, irrelevant as they were to her mission. Quite competitive with what her classmates were receiving, and with the offers she had received from the earlier interviews she had "practiced." After waiting a respectable period of time, she cabled Col. Jamison that she wished to accept his offer, and looked forward to reporting for work at the end of May. He had assured her that her clearances would be completed by then.

Carmen spent the next few weeks relaxing, mainly at the beach, in the pleasant spring weather. From here on out, her contact with Mexico would be essentially nil. With regard to the clearance investigation, this was probably an unnecessary precaution. She had been briefed on the nature of the TS and Q clearance processes. They performed a very thorough check of your past through interviews with friends, relatives, teachers, and employees, but they did not monitor your activities. Nevertheless, she simply did not wish to risk the chance of that a university friend might wonder about any unusual "off campus" activities.

In late April, she drove from California to Colorado Springs. But for her car, she had sufficiently few belongings that she might have flown. In any event, she thoroughly enjoyed the drive. She had not seen the Grand Canyon from the ground, and had planned to do so someday anyway.

She had a little trouble finding a place to live. In order to maximize the chances of success for her mission, she needed as much privacy as possible. With this in mind, she decided on a small bungalow, rather than the somewhat more convenient

lifestyle of an apartment building. After a few days' search, however, she located a place that was "just right."

On Monday morning, Carmen reported for work at Cheyenne Mountain, beneath which the NORAD facility was located. Col. Jamison received her, but sent her immediately over to a Lt. Col. Perkins, who was in charge of personnel. Most of the day was spent filling out forms, reading security manuals, and getting set up in her new position.

Carmen had been hired as a Senior Operations Research Analyst in the Threat Assessment Division. The Threat Assessment Division, or TAD, was concerned with taking all of the information from the various US sensor systems – DEWS, BMEWS, the satellite system – and estimating the nature and magnitude of an attack on the US. The threat assessment was then transmitted to the Weapons Allocation and Deployment Division, or WADD, which had responsibility for specifying the allocation and deployment of defense forces to incoming missiles and of determining the nature of the counterattack. The WADD also determined the specifications of a first-strike attack, upon orders to do so from the US President.

In the event of an actual attack, the threat assessment was performed virtually instantly, using algorithms developed by TAD. The TAD staff spent their time in the development, improvement, and modification of "real-time" computer programs to implement these algorithms. Similarly, the WADD staff spent their time in the development of databases, algorithms, and computer programs that could be used in real time to perform an automated tactical deployment of weapons and defense forces.

The only human actions in the system occurred in the event of a US-initiated first strike. In this case, the decision to attack, and the nature of the attack – counterforce/countervalue, countries to be attacked, attack constraints (attack size, specific targets, triad components used, etc.) – were specified by the President. Moreover, a first-strike attack could not be initiated solely by the

President. It required orders to proceed from three sources – the President, the Chairman of the US Joint Chiefs of Staff or the Secretary of Defense, and the Speaker of the House of Representatives, who had to certify that Congress had in fact declared war on the countries to be targeted. These three individuals were called “initiators.”

Carmen was disappointed when she had first learned of her assignment to the TAD. She had expected to be assigned to the WADD, since her background in optimization matched the nature of the WADD mission better than her minor in statistics matched the nature of the TAD work requirements. There had been no question, however, about her acceptance of the offered position; it simply meant that her mission would be more difficult than it might otherwise have been. Eventually, she would have to arrange a transfer to WADD. For now, however, she would learn what she could through her position in the TAD.

Carmen’s next few months were filled with activity. She applied herself relentlessly to the task of learning as much as she could about the NORAD system. In addition, she socialized with as many of her fellow employees as possible, particularly those in other Divisions. In spite of numerous propositions from the men of the facility, she established relationships with none of them. She knew that she might someday have to establish such a relationship in order to further her mission, and she could not afford any “strings” that might complicate this objective.

Her assignment to the TAD, it turned out, was quite helpful. She was able to become familiar with many of the same databases that were used by the WADD – databases that contained detailed information on weapon inventories, defense characteristics, target specifications, and the like. The time came, however, when she had learned all she could from her position in the TAD. She had to relocate to the Weapons Allocation and Deployment Division to complete her mission.

According to the NORAD organization chart, Brigadier General Sam Torgenson was in charge of the WADD. His position was a key to the accomplishment of Carmen's mission, for two reasons. First, he would approve any transfer of personnel to his division. Second, he was one of six individuals – two per shift – who could receive the call from the three initiators to set in motion a first-strike attack. These individuals were called “receptors” – at least one had to be on duty at all times. It was time for Carmen to meet Gen. Torgenson.

Her opportunity came soon enough. In late September, a picnic was held for the Technical Support Section, which included the TAD and WADD. As head of the WADD, Gen. Torgenson would surely attend. This was one picnic that Carmen would not miss.

XI. WINTER IN ASPEN

Preface

With regard to individual sexual behavior, the principles of sociobiology require that individual's engage in social and sexual activity in such a fashion as tends, on the average, to improve and increase their gene pools. While individual actions are not controlled, the statistical control – both in mean and in variance – of the species is complete, assuring the species' evolutionary adaptation and survival. All human social and sexual activity is directed by genetic control – the stronger family ties in the harsher environments, the higher birth rates in areas of high infant mortality, the longer period of male fertility, the breakup of marriages after the children are raised – all are consistent with the sociobiological theory of genetic control of behavior.

“What a nice idea...” Carmen mused as she snacked on the selection of appetizers that had been spread on the long table at

the north end of the pavilion. "...What a nice idea to have a picnic for the families of the department staff." It was somewhat past the appointed starting time for the picnic, and most of the staff members had arrived. The Recreation Committee for the picnic had arranged a number of outdoor games for the children, and they seemed to be having a grand time. The weather couldn't be nicer. The sky was deep blue, and the mountains stood out clearly in the distance. Carmen watched the children, and relaxed in the warm afternoon sun as she chatted with the other members of the Divisions.

At one point, Col. Parker, head of the Threat Assessment Division, walked over to her and introduced his wife. They chatted for a while. It appeared that the arrivals to the picnic had ended, and Carmen was concerned that Gen. Torgenson might not be coming.

"Is Gen. Torgenson coming to the picnic?" she finally inquired of Col. Parker.

"Why, yes, I'm sure he'll be here," Col. Parker responded. "He almost always attends social functions, but he never stays for long. He's not much on small talk, I'm afraid," Parker commented.

Parker was right. The General arrived a few minutes later, with his wife and youngest daughter. Although Carmen had never been introduced to the General, he had been pointed out to her at the base, and she recognized him. Although she intended to talk with him, she did not want to appear forward, and so she made no obvious effort to meet him. She knew, however, if she stayed near the food and drink, the likelihood of a "chance" encounter was almost certain.

Sure enough, after a few minutes the General walked over to the appetizer table. He was talking with Col. Parker. As they approached the table, Parker saw her, and turned to the General.

"Sam, this young lady was asking about you!" he joked, as he placed his left hand on the General's shoulder, and motioned his right hand toward Carmen. The General glanced in her direction.

He was evidently a “ladies’ man,” for he smiled broadly and his eyes twinkled at her. There were times when good looks were indispensable.

“Carmen, meet Gen. Sam Torgenson. Sam, meet Carmen Mirenda,” Parker continued. “Carmen is an OR Analyst in the Threat Assessment Division.” Carmen and the General shook hands.

“Damnation, Bob!” Torgenson blurted, obviously struck by her good looks. “OR Analysts aren’t supposed to look this good. Jamison must have owed you a favor!”

Parker laughed, and responded, “You mind your manners, Sam. Carmen still thinks we run a respectable operation here.”

The situation couldn’t be developing better. The General asked her about her background and what she did here at NORAD. Carmen engaged him in a lively conversation, and was impressed at his quick wit and dynamic personality. His spontaneous, offhand manner was not consistent with the military stereotype.

The General was obviously interested in her, for he actively continued the conversation. Before they could get past the pleasantries, however, the conversation was interrupted. The General’s wife, with a group of women, had noticed the attention he was giving Carmen. She excused herself from the ladies’ group, and joined her husband. “I’m Mrs. Torgenson, my dear,” she introduced herself to Carmen. She obviously did not like for other women to engage her husband in conversation, and least not good-looking young ones.

“Damn,” thought Carmen, “that’s the end of *that* conversation.” She silently lamented her bad luck, while addressing the General’s wife as sweetly as she could, “Why, I’m so pleased to meet you. I’m Carmen Mirenda.”

The General explained that Carmen was a member of the TAD staff, and he made a few other comments, but Mrs. Torgenson’s arrival effectively terminated the conversation. Evidently unwilling to risk his wife’s wrath after the picnic, he assumed his formal role

as head of the WADD, and continued the discussion with a few bland remarks about the good food and well-organized games. Carmen perceived correctly that continuing the conversation was definitely not in the best interests of either her or the General, and she excused herself, explaining that she wanted to meet some of the other new faces she had seen at the picnic. As she took her leave, however, she made a point of shaking the hands of the General and his wife. As the General shook her hand, he momentarily squeezed it. He was obviously interested in continuing their discussion at a later date.

Carmen didn't have to wait long for her next opportunity to meet the General. While she and the staff ordinarily ate in the staff cafeteria, the General usually ate by himself, or with one of the two other senior command officers. On Tuesday, however, the General ate in the staff cafeteria. Carmen was already seated and eating when he arrived. She noticed him as he was leaving the cashier. He evidently had seen her first, for he was looking straight at her when she noticed him. He smiled and nodded. He might have joined her, but the other seat at her table was occupied. She smiled to herself as he took a vacant table between her and the exit.

As she finished her lunch, Carmen glanced at the General from time to time. He was a ruggedly handsome man. Evidently in his forties, he was quite trim. He had a muscular build, and was somewhat taller than average. His hair was thick and dark, but prematurely gray at the temples. When they had shaken hands at the picnic she had noticed his large, strong hands.

Carmen excused herself from her luncheon partner, and headed toward the General. As she approached his table, he looked up at her, and smiled broadly.

"Well, hello," he began, "I trust we can continue our discussion without interruption today."

"Were we interrupted, General?" Carmen coyly asked as she returned his smile.

He laughed, and continued by asking her to tell him about her work.

“Well, General, as you’re aware, I’m in the Threat Assessment Division. I’m currently involved in implementing a sequential Bayes procedure to estimate the allocation of enemy weapons to area defense ‘islands,’” Carmen explained.

“No kidding?” he responded. He raised his eyebrows. Most of the women at the facility were secretaries or programmers. He evidently was surprised at meeting a lady mathematician.

“But tell me about yourself, General,” Carmen added, shifting the center of the discussion back to him. Maybe he was turned off by “overly-intelligent” women.

“Well, you already know what I do here at the base. On my own time, I ski in the winter and white-water-canoe in the summer. Do you ski?” he asked, looking directly at her and smiling a half-smile in curious anticipation of her response.

“Why yes,” she answered, “I do. I skied a lot when I was in California and Nevada – particularly at Heavenly Valley and Squaw. I’m looking forward to trying the Colorado slopes this winter.”

“That’s great,” the General stated. “I have a lodge at Aspen. Will you join me for a weekend?”

Carmen was stuck by his forthright manner. No apologies, no excuses, no explanations – and no refusal expected! She might have considered him arrogant, but he was too frank. No, it wasn’t arrogance, it was confidence. He was evidently attracted to her, and she had expressed an obvious interest in him. In that knowledge, he apparently considered it a waste of time to beat around the bush.

“Why, General,” she smiled broadly, lowering her head slightly as she placed her glass back on the table, “what will Mrs. Torgenson think?” She enjoyed putting him on the spot.

“You bitch,” he chuckled as he spoke *sotto voce*. He apparently didn’t expect to be played with. Evidently he fancied himself in

control of most situations, and was surprised at her independence.

“You bastard,” she responded softly, looking him straight in the eye as she smiled.

“Well, will you or won’t you?” he demanded, still speaking softly and smiling his curious half-smile. He evidently enjoyed making her say ‘yes.’ But she would not make it too easy for him. He was obviously attracted to her. He wouldn’t accept a ‘no.’ But he needed the challenge that only ‘no’ could bring. She knew she had to take this man – her mission demanded it – but she couldn’t say ‘yes’ outright. She smiled at him, looking him straight in the eye. She slowly stood up, keeping her eyes fixed on him all the while. She leaned over the table toward him, crossing her hands behind her back. As she leaned toward him, her eyes twinkled, reflecting her delight in tormenting him. Her lips were only inches from his. His eyes widened slightly, for he was now quite uncertain as to whether she was going to accept or reject his too-forward proposal – maybe even slap him in the face, right here in the middle of the cafeteria. He sat motionless, his eyes fixed on hers, as she slowly whispered, “No.” For a moment, she left her lips rounded in the form of an “O.” Then, she smiled broadly, straightened up, turned around, and walked away.

The General was speechless. He had not been taunted so in his life. Jesus! Never had he met a woman so in control of herself. She had treated him like a child, but he loved it. He had to have her.

On Friday, he telephoned her. It was eleven o’clock. “Miss Mirenda,” he began, in his most humble – and out-of-character – fashion, “this is Sam Torgenson.”

“Why, yes, General. What can I do for you?” she responded, in a friendly, business-like voice.

“Well, “ he began, “I wanted to apologize for my poor manners the other day. I hope you weren’t offended. With your

permission, I would like to make amends by taking you to lunch today. Will you join me?" he asked.

Carmen smiled to herself. He was quite contrite. She had made her point. She quickly responded, "Why of course, General. I would love to. What time shall we meet?"

"Uh," – he had evidently not expected her to respond so quickly in the affirmative – "why, can I pick you up at the entrance at 11:30?" he asked.

"I'll see you then," Carmen replied, and placed the receiver back in its cradle.

At the appointed time and place, Carmen met the General, and they drove to town. The General was his most charming self – his manners were impeccable. He drove her to one of the nicest restaurants in town. At the restaurant, he engaged her in conversation on several topics of current interest.

"Where are you from?" he asked at one point in the conversation. "How did you come by such a Spanish name?"

Carmen explained that she was born of Mexican-American parents, and raised just outside of El Paso.

"What's your middle name?" he asked.

"Felina," she replied.

"Wicked Felina?" he kidded, with his curious half-smile.

"Why, whatever do you mean?" Carmen asked.

"Oh, the only other time I've heard the name 'Felina' was in the western ballad, *El Paso*. You must have heard the song," he asked.

"Oh, yes, of course – I've heard it a hundred times," she laughed.

"Does everyone call you 'Carmen'?" he asked.

"Why, yes," she replied.

"Well, I'll call you 'Felina,'" he said, in a serious voice.

"May I remind you of what happened to Felina's lover in the song?" she asked, teasingly.

The General smiled. The identification she had made was not lost on him.

At the end of the meal, he asked, "May I see you again?"

"Why of course, General," she replied.

"Please call me Sam!" he insisted. "May we have lunch again next Friday?" She had evidently made him quite gun-shy. Carmen wondered how long it would be before he asked her to visit his lodge again.

"Okay, Sam", she replied, and they left the restaurant.

Next Friday, they had lunch together again. At the end of the meal, Sam mentioned that they had had a lot of snow recently at Aspen, and the skiing conditions were excellent. He said that he was planning to spend the weekend skiing. Now that he had suitably 'courted' her, he approached the question of her spending the weekend with him. Still not one to skirt the issue, he asked, "I'd like it very much if you'd meet me there." This time, however, he wasn't smiling. He was dead serious. She had him hooked.

"I'd love to, Sam," she responded.

His eyes reflected his pleasure at her acceptance. He smiled. Then he laughed. She had made him say "Please" in no uncertain terms. But his spirit was indomitable. "You're a tough nut to crack!" he laughed.

The discussion turned to plans for the weekend. Sam said that in view of his "awkward" family situation, it would be best for her to meet him there. He gave her directions to the lodge, and indicated that he would be there by eight o'clock Saturday morning.

Aspen, Colorado...

Carmen arrived at the lodge shortly after nine o'clock on Saturday morning. Sam had a roaring fire going. He was delighted to see her. "Have you had breakfast?" he asked. She

replied that she had had only a cup of coffee before leaving, and that she would love to eat.

After breakfast, they headed for the slopes. The sky was crystal clear in the morning, and they had a delightful time on the slopes. They both seemed a little surprised at the other's ability – he, because she was a female, and she because he was forty years old.

Since this was her first time out this year, she did not feel like skiing the entire day. Instead, they spent the afternoon shopping through the quaint shops of Aspen. After a relaxing meal in one of the village's many good restaurants, they returned to the lodge for the evening.

Sam rekindled the fire, and they talked as the logs gradually turned to coals. Sam fixed some mulled wine. It had clouded over in the afternoon, and was snowing now. The warm mulled wine and the warm fire and the softly falling snow lent a special charm to the evening's romance.

[Abridgement 3. Here follows a passionate evening between two new lovers. The following day, in the late afternoon, Carmen and Gen. Torgenson return to Colorado Springs.]

Sam was fascinated by his new romance, and he saw her frequently over the next few weeks. Then, one Friday at lunch, Carmen decided that it was time to make her next move. She was sufficiently quiet at lunch that Sam should notice, and he did.

"You're rather quiet today," he commented on her pensive mood. "What's the matter?" he asked.

"Oh," she hesitated slightly, "it's nothing."

"Come on, tell me," he insisted.

"Well, it's my job," she began. She had refrained from talking about her job much since they met, in order to provide this moment its full impact. "As you know, my major field is optimization theory, with a minor in statistics. The reason I was

drawn to this job at NORAD was the opportunities it afforded in my major field. But the work in Threat Assessment is all statistics. It's interesting enough, but it's not what I want to do, or what I expected to do here. All the optimization that's done here is in Weapons Allocation and Deployment – your division. At first I considered asking Parker for a transfer, but working in your division would not be a good idea, given our relationship," she paused.

"Are you really quite concerned over it?" he asked, attempting to find out exactly how she felt.

"Well," she said, "I've received an offer from another firm to do work in optimization of large-scale systems. It would mean a move back to the West Coast."

Sam reacted exactly as she'd planned. He didn't want her to go. It was still too early in their relationship. He was still infatuated.

"You can't go!" he protested. His response was immediate and direct. "Look," he said, "if you want to work in Weapons Allocation, I'll have you transferred. We wouldn't be interacting on a day-to-day basis – there wouldn't be any problem."

"Do you really think so?" she asked. "I don't know..." she trailed off.

"Of course it'll work," he insisted. "I'll talk to Parker on Monday and arrange it. He can't possibly register much of an objection, since your background is in fact better matched to the requirements of the Weapons Allocation and Deployment Division than the Threat Assessment Division, anyway. He'll not like losing you, of course, but he and I get along well. There'll be no problem."

"I don't feel right, using our relationship to effect the transfer," Carmen continued. In fact, however, I shouldn't have to – I should have been assigned to WADD in the first place."

"Look," Sam responded, "I can transfer you on your technical merits – forget the relation-ship. So far as I'm concerned, this is a

proper organizational response to counter losing a valuable employee. But so far as using relationships is concerned, your concern is ill founded: everything is based on relationships. If you go through life looking for justice, you're going to be disappointed. You've got to be good to get ahead, but you've got to recognize that human beings run organizations, and in the final analysis, all-important issues involve personalities, opinions, subjective value judgments, emotions, and human desires. The objective decisions aren't important – a machine can make them.”

Sam was turning philosophical. But Carmen had achieved her objective. Her transfer was a *fait accompli*. With her objective behind her, she relaxed in their conversation, and continued.

“Why, you surprise me, Sam,” she interrupted. “You seemed to be a very logical person. Has your career been guided by emotion and human desire?” she teased.

“Carmen,” he began, purposely forgetting the sobriquet he had given her – he only called her by her first name when he got serious. “My whole life has been guided by emotion and desire. I was born a soldier. The only times in my life when I've felt that my life had any meaning was when I was leading men into battle.” His eyes had a distant look to them. She imagined by the reflection of the light in them that they were slightly moist. “I can't begin to tell you what battle is like. *The danger* – life has true meaning and value relative only to the possibility of death and dying. *The importance of what you're doing to your family, your nation, the soldiers in your command* – the challenge, the one true test of a man, and the thrill of the ultimate gamble where the stakes are life itself.”

As Sam spoke, Carmen reflected on the physical aspect of this man, so compelled to live life to its fullest – a hard-driving man who followed his heart, and demanded all that life had to offer. She recalled how easily he had approached her, how insistently he had pursued her, and how fully he had enjoyed her. And, for a moment, she reflected – but only for a moment – on how she was

using him. For she, too, was in a battle of survival for her nation, and she had but a single purpose at hand.

“But Sam,” she interjected, terminating his philosophical tangent, and her own. “Your work at NORAD – in defense of the country – is surely as important as the actual battle itself.”

“It’s like sucking a tit through a nightgown!” he exclaimed. She laughed at his sensual physical analogy.

“Sam,” she laughed, “you’re too much!”

Two weeks later, Carmen reported for work in the Weapons Allocation and Deployment Division. Her first few weeks on the job fit perfectly with her mission; she was assigned the task of becoming familiar with all of the major components and functions of the Division. The software (computer programs) driving the US ballistic missile defense and offense was a work of art. The decision rules determining the allocation of defense forces were determined by an elaborate optimization scheme that allocated the forces in a fashion that minimized the expected damage subject to whatever constraints were specified, such as defense of a high-priority target – city, military installation, or industrial facility. During an attack, the deployment of the positioned defense forces was controlled by a dynamic optimization scheme that continually revised the deployment, given the changing nature of the attack, changes in the levels of the defense forces, and the damage to the US targets.

The allocation of defense forces to areas was revised on an annual basis, given changes to the relative “values” of US targets, and the changing characteristics of the defense capability. The deployment strategies were modified/updated on a more frequent basis, in response to changes in the political situation on the enemy’s military posture.

The defense software consisted of a computer program and an associated database. The program was not frequently modified. Most often, changes were made to the database. And, since

these changes were relatively frequent, Carmen perceived that it would be a relatively easy matter to modify the database to reflect a Mexico-optimized defense.

Over the course of the next two months, Carmen determined a small number of changes that could be made to the database, to substantially lessen the likelihood of damage to Mexico. The defense parameter database was extremely large – consisting of a very long list of US and allied targets, their locations, types, values, hardnesses, and characteristics of area and terminal defense components – so many data elements that it was virtually impossible to detect a small number of data modifications. Furthermore, most of the changes did not involve critical US targets, further lessening the chance of their being noticed.

Carmen had memorized not only general guidelines to follow in modifying the defense, such as exhaustive defense of major Mexican targets and heavy defense of nearby US targets, but also specific defensive features to incorporate. These changes included items such as exhaustive defense of the IBM computer facility in Tucson, the Boeing plant in Seattle and the Texas Instruments facility in Dallas – in every case, high-technology facilities that would take years for Mexico to reproduce, were they lost. The President had also requested a few other defense specifications, such as the exhaustive defense of Salt Lake City, given the special relationship of the LDS church to the American Indian.

Important as they were, the significance of the modifications Carmen was making to the defense software and database paled in comparison to the significance of the impact she must have on the offense. There were two main components in the offense software – the “first-strike” component and the “second-strike” component. The first-strike component allowed the initiators numerous options, enabling them to specify not only the general nature of the attack – counter-value/counterforce, size of attack, countries to target, selected targets, etc. – whereas the second-

strike component allowed the user considerably fewer options, consistent with the requirement for rapid response.

Carmen quickly realized that there was virtually nothing required in the way of software / database modifications for the offense – she need only control the initiators' specifications. With the completion of the defense modifications, Carmen set to work on the implementation of a procedure for effecting this control.

The US system for guarding against an erroneous first strike was virtually failsafe. There appeared to be no way for a “madman” – or even for a lady secret agent – to simply “press a few buttons” and send a thousand screaming missiles on their way toward Russia. The attack could be started only by the three initiators, who must each independently provide a secret code to each of three receptors at NORAD. Without the receipt of the secret code and the subsequent action of the three receptors, a first-strike attack could not be launched.

Since the three receptors were in physically separated and secured sections of the facility, the likelihood of initiating a first-strike attack without a complete takeover of NORAD seemed slim. After a thorough review of the system, Carmen decided that the weak link in the system was the “secure” voice communications network, over which the secret code and the initiators' commands to attack were transmitted. If she could compromise this system, she could learn the codes required to initiate the attack, and send the initiating messages.

Carmen had been thoroughly briefed on the characteristics of the secure voice network. It consisted of pressurized coaxial cable that instantly registered any disturbances, and air transmission using an encrypted digitized signal. That is, the voice signal was first converted to a multiplexed pulse-code-modulated (PCM) signal, consisting of a string of “bits,” or “zeros and ones,” or “pulses.” The string of pulses was then encoded using a cryptographic algorithm similar to the “Data Encryption Standard” used by commercial businesses to transmit data in a

secure fashion. To break the code, Carmen needed access to two “keys,” or formulas used to encode and decode the messages – the sender’s key and the receiver’s key. “Cracking” the codes was practically impossible. The encryption algorithm was based on high-order “primitive” polynomials in finite geometries – a straightforward attempt to break the code would require millions of years of computer time.

Fortunately, however, Carmen was not alone in her penetration of the NORAD facility. Vicente – “Vincent” – Santos, employed in the communications center, had gained access to the Defense Communication Agency’s encryption keys. Within a short time, he set up a receiving facility in a farmhouse outside of Colorado Springs, which was intercepting and decoding secure basic communications messages on a regular basis.

The procedure for initiating a first-strike attack was complicated. Each month, a DoD staff member would communicate three four-digit code numbers to the three initiators and receptors. Each initiator was paired, or “linked,” to a particular receptor. Each initiator-receptor pair was assigned the same four-digit code. To initiate the attack, each receptor had to receive a verbal command from his associated initiator, telling him the type of attack, the level of the attack, the time of the attack, the country targets, specific targets, special instructions, and the code number. In addition, at the beginning of their conversation, the initiator had to count to twenty, to provide the receptor with a sample of his voice. His voice was recorded, and the power spectrum of his voice sample was automatically statistically analyzed and compared to the power spectrum that had been recorded earlier. If the two sample power spectra were accepted as having been generated by the same source, and if the code numbers were correct, the receptor then entered the attack information into the attack initiation console in his section of NORAD. At the instant at which all three receptors had input the same attack information into their respective consoles, the attack system was enabled, and

prepared to go. Unless an abort message was received from any one of the three initiators, at the specified time the attack was begun.

The major problem to be faced in initiating an attack was transmitting, to the three receptors, voice messages that would appear to be genuine messages from the three initiators. Getting the code numbers was solved, once Vicente had set up the facility for intercepting the secure voice communications. In order to emulate the initiators' voices, a special electronic device had to be developed that would electronically filter an input spectrum in such a fashion that whatever the input spectrum, the output spectrum of the filter was not statistically significantly different from a twenty-count sample spectrum of the actual initiator's voice. In other words, an individual would talk into the device, and his voice would be filtered so that he sounded "exactly" like the initiator. Of course, he had to modulate his voice in a fashion similar to the initiator, but the spectral density function of his voice was modified so well that the two voices seemed indistinguishable. All that had to be specified to calibrate the device was a three-hundred-word sample of the "fake" initiator's voice and a three-hundred-word sample of the "true" initiator's voice. These two samples were then used to determine the filter characteristics required to modify the fake initiator's voice into the genuine initiator's voice.

At Carmen's request, the voice emulator was developed back in Mexico. It was an easy matter to get a recording of a three-hundred-word voice sample for each of the initiators – prominent Americans – which samples were required to calibrate the device.

The final step in development of the system required the transmission of the three emulated voices to the three receptors in NORAD. Vicente decided that it was not practical to develop a transmitter that could send a fake message to NORAD from outside the facility. Instead, he decided on an "internal" approach. Through an incredible design flaw, the internal telephone

switching circuits of the automatic secure voice communications network, the public telephone service, and the Federal Telephone Service were all located in the same room in the communications section of NORAD. It was an easy matter for Vicente to link up the secure voice network and the public network, so that, if the correct number were dialed, the “public” call would be directed to a desired secure voice network telephone.

With the completion of this modification, the stage was set. A US first strike against Russia could now be initiated, essentially, from any public telephone in the United States.

XII. SPY VS. SPY

Chihuahua, Mexico...

Victor Torres pressed the bottom on the power microphone, and began his report. His transmitter was equipped with a cryptographic encoder, and so he made no effort to disguise the context of his report. He was located just north of Chihuahua, and was beaming his report to Washington.

“Bob,” he began, “I believe I’m on to something big. I’ve discovered several massive caches of military hardware. Unbelievable quantities. Stored in large warehouses in towns just south of the US border. And it’s some pretty strange stuff. I don’t have good counts on each item, but the numbers are in the thousands in every case. First, there are the jeeps. Thousands of military jeeps. Each one with a fifty-caliber machine gun mounted on the back. Then, there are the personnel carriers. Just regular personnel carriers, except for one thing – they’ve all got heavy curtains lined with woven lead – I repeat – lead. In fact, I forgot to mention that the jeeps have lead-lined curtains, too. Next, there are the Geiger counters. Thousands and thousands of them, of several types – some battery powered, some with

solar cells, and some with tiny hand-powered generators. In addition, there's a large variety of small military hardware – rifles and the like. But it's curious – not much really big stuff, like tanks and helicopters. It's all skirmish or 'clean-up' caliber." He moved the mike from his lips as he checked his list of items to report.

"Oh yeah – one other hardware item that I saw a lot of, but it's not military. Windmills. Thousands of windmills. In fact, they're more than windmills. Sort of an integrated energy package. A windmill and supporting structure, plus a lot of interchangeable components – a generator, a pump, a thresher, a grinder, and a gearbox. Also, there's a voltage regulator, a storage battery, and a short-wave radio. In addition, there's a solar oven with each windmill. I wouldn't have mentioned the windmills, but they're stacked right along with the military equipment. All broken down into kits, ready for assembling."

"That's it for hardware. With regard to personnel, there's a great deal of activity. The Mexican reserves are massive, and they're all on alert. Evidently not just here, but all over the country. Bob, I tell you, there's something going on. I don't know what it is, but it's big. Either the Mexicans are getting ready for an invasion, or they're planning to make one. And from all the nuclear gear, I'd say they're getting ready for a nuclear war. Well, that's about it for now. Any messages?" Victor dropped the mike, and waited for a response.

Then, over the speaker, Victor heard, "Code MVK27, Repeat... Code MVK27." That meant that his message had been received, no repeat was requested, and no response was to be sent.

Washington, DC...

The President dropped the phone from his ear and flicked on the conference unit. "I'm sorry, Roger, but Bill just came in. I'd like for him to hear your report. Could you go over the main points again?"

The intelligence official summarized his report. “Mr. Secretary, as I was telling the President, something big is going on down in Mexico. We have reports from several agents, and it all ties together. First, there’s been a full-scale troop mobilization. As you’re no doubt aware, the Mexican reserves are really large – universal conscription for all eighteen-year-olds, male and female. The mobilization appears to include all their active forces, and many of their reserves. Second, they’ve produced an incredible amount of small-scale military hardware – rifles, jeeps, machine guns, and the like – and most of it is being stored in towns near the US border. Third, over the past year they’ve had a massive educational campaign in the schools and factories on what to do in the event of a nuclear attack. And fourth, a good deal of their equipment is related to nuclear warfare. Well, those are the facts. I wish that an interpretation were as clear. On the other hand it looks as though they’re preparing for a nuclear attack on Mexico. On the other hand, it appears as if they themselves are going to initiate an invasion.” The intelligence officer paused.

“Well, Roger, tell Bill your assessment of what’s going on,” the President asked.

“The hypothesis that is most consistent with the facts is that Mexico expects to be the victim of a nuclear attack, with a subsequent invasion by conventional ground forces. But it’s not clear what sort of invasion they expect. They have remarkably little heavy armor, such as tanks or planes,” Roger explained. “Also, it’s not clear why they’ve placed most of their equipment near the US, rather than all along their sea boundaries as well.”

“What else do you know, Roger?” the President asked.

“Well, we’ve been attempting to find out exactly what their plan is, by infiltrating their military and national security organizations. But they’re tight as hell. We know that they’ve been monitoring our NORAD facility closely, and so we suspect that they may have an agent somewhere in NORAD. Nothing at all concrete, however,” Roger admitted.

“Tell Bill what else you found,” the President laughed.

There was a pause on the line. Roger had seemed reluctant to report the fact earlier to the President, since he hadn’t any reasonable explanation for the fact.

“You mean the windmills, sir?” Roger asked.

“Windmills? What do you mean, windmills?” Bill interrupted.

“They’ve built thousands of windmills, sir. They’re all stored in place with the military equipment.”

Bill laughed. “Maybe they’re planning to blow the fallout away, as a radiological countermeasure,” he quipped.

Roger joined in the laughter, but he was clearly uneasy. He didn’t feel comfortable unless all of the facts fit together.

“Seriously, Roger,” Bill continued, “Maybe they’re planning simply to export all that equipment. That might explain the mixing together of unrelated equipment.”

“That’s a possibility,” Roger acknowledged, “but it doesn’t fit with the mobilization.”

“Another possibility,” Roger interjected, “is that Mexico has developed closer ties with Russia, and may believe that Russia is going to strike the US at some point with a nuclear barrage. Their ground forces could be part of a larger Russian invasion force.”

“That’s absurd!” the President retorted. “As low as our relations with Mexico have sunk, she is still fiercely anti-communist, at least the Russian variety. Besides, Mexico couldn’t launch a successful attack against Pima county, much less a coordinated large-scale effort against the whole US, even after a nuclear exchange. That’s getting pretty far-fetched. No, I think that Bill’s export hypothesis is more credible, or simply their fear of being invaded.”

“We’re simply trying to lay out all the plausible hypotheses that might explain the facts,” Roger countered, in defense of his rejected suggestion.”

“Well,” the President continued, “keep trying to infiltrate their command authority. Also, why don’t you send an agent over to NORAD to see if you can track down something from this side.”

“Yes, sir, we’ll get some extra manpower on that right away,” Roger replied.

Cheyenne Mountain, Colorado Springs, Colorado...

“Miss Mirinda, meet Col. Gowan. Col. Gowan, this is Carmen Mirinda,” Lt. Col. Perkins introduced the two.

Carmen shook hands with Col. Gowan. She was puzzled over why Perkins had asked her to meet with him today. And who was this Gowan fellow, anyway? A mean-looking son of a bitch, she thought to herself. She’d better be on her toes. Was it possible they suspected something, she wondered? Perkins escorted them to a free conference room, and left them alone.

“Miss Mirinda,” Gowan began, “as part of a more intensive security program here at NORAD, we’re conducting more thorough investigations of relatives in foreign countries. According to the clearance request form you filled out, you have several aunts and uncles living in Mexico. We need some additional information on these relatives – current addresses, current occupations, and the like. Also, we need to know what contact you have had with them over the past four years, and we need more details on your trips outside the country in the last four years. In addition, we would like to know what calls you may have placed outside the country.”

Carmen’s heart sank. They were after too much detail for a routine investigation. Something was definitely up. As she answered Gowan’s questions, she sized him up. She looked into his eyes – cold, hard eyes – but saw nothing. His upper eyelids slightly covered the upper portion of his iris. He never smiled. He had narrow lips, and talked generally in a monotone, with little modulation. He articulated his words carefully, leading Carmen to

suspect that his mind was about five sentences ahead of his speech. She quickly concluded that this man was on a specific assignment, and she was likely the center of it.

She answered all of his questions, and the interview was terminated. He said that he would remain in the conference room, to finish up some notes. His emotionless gaze never left her as she rose from her chair, crossed the room, and exited.

As she walked along the corridor back to her office, she reflected on the significance of the interview. She would have to be very careful not to make any slips. But what about Dom and Santi? They should be warned that something was up. But with Gowan around, she did not want to risk a call or meeting during the day. She would have to wait till evening.

At six o'clock in the evening, she placed a call to the transmission post where Dom and Santi were stationed. The phone rang and rang. "Damn!" she cursed to herself. One of them was always there. Something must be amiss. But should she risk a trip out there? She could be playing right into Gowan's hands. But sitting and waiting for a noose to close in on her was not her style. She decided to risk a trip to the station, being very careful not to be followed.

She arrived at the post at seven-thirty. She parked the car somewhat down the road from the house, and walked along the fence that lined the lane leading to the house. They had purposely selected a house with good visibility on all four sides, so that there was little way for her to approach unnoticed if someone were watching. As she neared the house, she saw Santi's car. Dom's car was gone, and there were no other cars nearby. Perhaps the telephone had simply malfunctioned.

The front door was closed, as were the windows. There was no way she could hear what was going on inside. She walked softly up the path to the front door, and up the steps to the porch. She knocked firmly on the door. No answer. She reached into her

pocketbook and grasped her pistol. She crouched down, placed her handle on the doorknob, and opened the door quickly.

She glanced quickly around the room. Nothing. She started to rise from her crouched position. Wham! The hard blow on the back of her head made her “see stars.” The blow sent her sprawling across the floor. Her hand was still on her gun, but before she could move, someone was on her back, a gun held to the back of her head. “Drop it, lady!” the man said. She recognized the voice! It was Gowan. Taking her gun from her hand, he got off her back and stood up.

“Okay, lady, into the bedroom,” he ordered. Carman stood up. She shook her head, trying to stop the ringing from the hard blow. What a fool she’d been! He’d been waiting outside the house for her all along. She should have been more careful – approached the house from afar, from a different direction, and circled the house. Water over the dam at this point, though, she thought to herself, as she rubbed the back of her head, she looked at Gowan standing there with his pistol aimed at her. He was cool as a cucumber. Ice water must run through his veins, she thought.

“Get moving, lady,” he ordered, nodding his gun in the direction of the bedroom.

She turned toward the bedroom and walked through the doorway. God! Her stomach turned at the sight of Santi, lying on the floor, dead, in a pool of blood. He was naked, his hands and feet tied together at his back. Her eyes flashed at Gowan. That monster!

“Okay, lady, to the bed,” he said, nodding the gun toward the bed. She sat down on the side of the bed. “Now,” he began, “tell me what’s going on out here.” Gowan was standing in front of her, the gun pointed straight at her.

“I was visiting my brother, Dom. Where is he? What is going on?”

Evidently not impressed with her answer, he slapped her hard across the face with the back of his free hand. As he did so, she

was tempted to make a play for it while he was slightly off balance from striking her, but she decided against it. Too risky. She was seated, he was standing; the gun pointed directly at her; and he was obviously a ruthless killer. Her only regret was that she might not get another chance to overpower him, good or bad.

“Don’t fool around with me, lady. Your friend Santi told me everything, before he kicked off.

Carmen thought that he was probably lying. Santi was well trained, courageous, and loyal, and would not have quickly divulged their mission. On the other hand, he had evidently been tortured, and it was unlikely that Gowan would have killed him without having some basis for suspicion. In any event, she had to assume that he had told Gowan nothing, in order not to be tricked into divulging something herself.

“Told you what?” she asked. “Look, I don’t know what you’re talking about. Is my brother in some sort of trouble? Who are you? What are you after?” she demanded.

[Abridgement 4. Here follows a knife fight, in which Carmen succeeds in stabbing Gowan, first in the groin, and then in the belly.]

“Stretch your hands out by your side!” Carmen demanded. He obeyed, moving slowly to avoid pain.

“Tell me what you know!” she ordered.

“Something’s going on... I don’t know what,” he groaned.

“Tell me!” she demanded, twisting the knife slightly.

“I don’t know!” he screamed. He groped for something to tell her, to stop the pain. “There’s a mobilization going on in Mexico... we suspected a spy here at NORAD... I was sent to investigate.”

“Who else knows you’re here?” she asked.

“No one.”

“Don’t lie! I know you make reports. Tell me!” She twisted the blade slightly upward. His eyes bulged from the pain.

“I haven’t made a report since last Tuesday,” he blurted.

“Why are you following me? Why are you here?” she asked.

“I got a list of all NORAD employees with relatives in Mexico. I followed you here last Friday.”

So, he obviously suspected her of something when he interviewed her today.

“What did Santi tell you?” she asked, twisting the knife further. He gasped in agony.

“Nothing! Nothing!” he groaned. “He wouldn’t talk.”

Carmen thought he was telling the truth. In her opinion, he would not lie to protect anyone but himself, and he was close enough to death to grasp at any chance to live.

“What else do you know?” she asked, in a final attempt to find out all the US government may know about her mission.

“Nothing, I swear!”

“When are you scheduled to make your next report?”

“By Saturday, if possible.”

Good, Carmen thought. By Saturday everything would be finished anyway. He wouldn’t be missed. She racked her brain, thinking of what else she needed to know from this man. She looked at his eyes. He’s scared, if he has any emotions at all, she thought. He evidently wondered what her next move was, now that the questions had stopped.

“Don’t kill me,” he groaned, in a desperate attempt to influence her decision.

She glanced over to the side of the room, where Santi’s lifeless body lay. From this angle, she saw the mutilation that had not been visible when she entered the room. Rage welled within her, and her eyes flashed back at Gowan. It was apparent what was on her mind. He started to move his hands from his side, but before he could stop her, she jerked the knife out of his belly and plunged it, just below his breastbone, into his heart. He grasped

at her hands, in a futile, too-late attempt to prevent her fatal thrust. His eyes bulged and his body tensed, and his chest recoiled as his body instinctively arched away from the blade. His mouth opened wide in a speechless – but not entirely inarticulate – reaction to his demise. He gasped slightly, in too much pain to inhale or exhale. His hands clutched her hands and wrists, as he attempted to remove the blade from his chest. Summoning all her strength, she thrust the blade as hard and as deep as she could, twisting downward on the handle in an attempt to stop his heart. His fingers dug into her hands in a final desperate but wholly futile attempt to remove the blade. But his wound was mortal, and as the blood ceased to course through his brain, his mind dimmed and his senses numbed. His eyes moved from wide-open to half-closed, and his eyelids quivered as he slowly blacked out, and his head fell back on the bed.

Carmen pulled his fingers from her hands, and slipped to the side of the bed. She was enervated. She sat on the side of the bed, her feet on the floor. Placing her elbows on her knees, she dropped her head to her hands, and closed her eyes.

Suddenly, she was electrified by the sound of the screen door slamming, as someone entered the house. She whirled around, pulled the knife from Gowan's lifeless chest, and faced the door.

"Oh my god!" Dom uttered, as he burst into the room. He recoiled at the macabre sight of the two naked, bloody bodies, and at Carmen, herself naked and bloodspattered, but quite alive, facing him from the bed, the knife in her hand, poised to face this next intruder.

"Oh, Dom!" she blurted, overjoyed at seeing him. She rushed to him, throwing her arms around his neck and hugging him. "Oh, Dom," she repeated, and now that the ordeal was behind her, she let herself go. Tears streamed from her face, and she sobbed as Dom comforted her. "Oh, Dom," she cried, "They killed Santi, poor Santi."

There was little Dom could say to comfort her, and he simply held her in his arms. Groping for words he mumbled, "It's a rotten business." Then, glancing at the two dead bodies, he turned Carmen toward the door and said, "Come on, let's get out of here." Arms around each other's back, they walked out of the room.

XIII. A HOLIDAY IN SAN JUAN

Merida, the Yucatan Peninsula...

Melinda Reyes walked across the macadam surface to the white Lear Jet that was waiting for her. She unfastened the retainers, kicked out the chocks, and stepped into the plane. It was a hot summer afternoon, and the interior of the plane was "roasting," in spite of its gleaming white skin. She checked out the systems and started the engines.

As she rolled slowly into position for take-off, she reviewed the situation. Everything was set to go. The big jumbo jet was ready, and would leave for Miami in the morning. She had run the crew through countless training sessions. Every untoward contingency had been simulated, and countermeasures developed and practiced. The hard work was over, she reflected, and the excitement was just about to begin.

"Lear 7906 cleared for take-off," directed the voice from the speaker. She pulled back slightly on the throttle, released the brakes, and pulled the throttle all the way back. The engines screamed, thrusting the plane forward on the runway. Melinda thoroughly enjoyed the sense of power as the acceleration pushed her back into the seat. She lifted off at full throttle, and soared into the deep blue sky, brushed with a few wispy high-atmosphere clouds. As she banked left to leave the airport pattern and begin her trip to Miami, she glanced below at the big

jet parked at the far end of the field. If all went well, it would be headed back here this time tomorrow.

As her plane streaked through the sky to Miami, she passed the time reviewing the plan for tomorrow's operation, and reflecting on what had been accomplished to date. She wondered how Cecilia was doing. She didn't envy her part of the operation at all. All those details! She had called Cecilia in Miami the evening before, and evidently everything was set up.

Cecilia Velasquez had been assigned agent in charge of "The Conference," as her portion of the mission had come to be called. Her job was to implement the kidnapping of a significant number of the US scientists who were engaged in fusion research – the key to a limitless source of clean nuclear power. It was estimated that US scientists were now only ten years away from development of a practical fusion reactor, the technical feasibility having been demonstrated at several years ago. With Mexico and the rest of the world running out of cheap oil and coal, and with the increased concern over the greenhouse effect (the possible heating of the atmosphere caused by the trapping of the sun's heat by the carbon dioxide produced by burning much of the earth's fossil fuels in a single century), the preservation of this capability was considered a critical element of the total mission.

There were several major problems that had to be resolved to effect a successful mission. First, fusion research effort was regarded largely as a collective capability. Several US scientists and organizations were making headway, and no single individual stood out as the key person. Second, it was considered unsatisfactorily risky to save only one person with this capability, even if he had a sure chance of demonstrating a practical method – his untimely death would destroy the entire effort. Third, straightforward kidnapping of the scientists had several drawbacks. They would resent Mexico's action against them, and possibly refuse to cooperate. In fact, if it even appeared that Mexico had something to do with the exchange, they might

refuse. Fourth, it was considered necessary to kidnap not only each scientist, but his immediate family, for the same reason. Fifth, the entire operation had to be executed just prior to the attack; otherwise, the US government would surely become aware of the mass kidnapping, and take action.

With all these constraints, Cecilia's job was not an easy one. Working together, however, she and Melinda had worked out a plan that seemed to have an extremely high likelihood of success, and satisfactorily addressed all of the major problems. That plan was now in its final stages of implementation.

The plan centered around a major conference on the current status of fusion research in the US. The US government had been criticized for years for not promoting this seemingly perfect solution to the energy crisis, so the conference would be of considerable interest. To enhance its appeal, Cecilia had engaged the support of a prestigious US research foundation. Endorsements from several major fusion scientists quickly followed, and heavy participation of the Conference was assured.

Cecilia's background was superbly matched to the requirements of the project. "She had earned her Ph.D. in high-energy physics under one of the leading US scientists in the field. While she was too early in her career to be considered a "heavy-weight," her contacts in the field were substantial. These contacts considerably enhanced her ability to promote the conference. Moreover, her own credentials were quite adequate to justify her role as director of the conference.

To enhance the appeal of the conference, the conference was to be held in San Juan, Puerto Rico, at one of the major conference hotels. The conference was to be held in summer – a perfect time both from the viewpoint of the seasonal wind patterns and from the viewpoint of the scientists' schedules – many of them were professors whose summers were free.

As far as Miami, the transportation had been arranged through commercial US air carriers, ostensibly to keep transportation

costs low, but in fact to assemble all of the participants together and preclude their making individual travel arrangements. Each participant was sent tickets for himself and his family. All flights were routed to Miami, at which point everyone would transfer to a single wide-body charter jet bound for San Juan. That jet was scheduled to depart from Miami at three o'clock tomorrow afternoon.

Melinda's reverie was broken by the realization that she was now quite close to her destination. She began her descent, coasting smoothly in the clear Caribbean air toward the coast of Florida. She banked her plane slightly to the left as she started into the landing pattern for Miami International Airport.

As she walked out of the airport lobby into the bright, hot Miami sun, she was greeted by Manuel Cuesta.

"Welcome to Miami, Melinda!" he greeted her heartily, a broad smile on his face. "How was your flight?"

"Great," she replied, returning his smile. "How's everything here in Miami?" Melinda asked, more out of politeness rather than genuine inquiry. Since she would soon be briefed by Cecilia, there was little point in asking Manuel to fill her in.

"I'll be driving you to the office," he explained, "then I'll be coming back here to take your plane back to Merida."

As they drove along the route to the office that had served in a dual capacity as Conference planning headquarters and a travel agency, Manuel related some of the minor difficulties they had encountered over the past few weeks. As technical conferences go, this was a relatively large one. For this many people, the logistical details – travel arrangements, room reservations, and the like – were considerable. In addition, Cecilia had assumed major responsibility for the program, and the job of arranging speakers was no mean task. Finally she had attempted to solicit papers for discussion groups, further compounding the conference preparation task.

They drove into the hotel parking lot and parked the car. As they walked into the office reception area, Cecilia was standing at the secretary's desk, reading a note. She glanced up as they entered, and her face registered happy surprise. She stepped quickly toward Melinda and embraced her.

"I'm so glad you're here!" she started. "Is the plane ready?" she asked, her face reflecting the concern for the key component of their mission.

"Everything's fine," Melinda assured her. "Just like clockwork! It's all set to go – it'll be coming at nine in the morning," she laughed.

"Come into my office," Cecilia continued, "and I'll fill you in on the situation here. Would you like some coffee?" she asked. Melinda enjoyed Cecilia's enthusiasm and spontaneity. Although they had worked together for only a few short periods, they were good friends, and enjoyed each other's company.

They sat down at the table in Cecilia's office, and discussed the situation. Melinda related how the team of agents handling the plane had practiced their mission numerous times in simulated exercises in Mexico, and an actual test flight over the same course as was planned for tomorrow. Everything was in order.

Cecilia indicated that all of the major problems associated with the conference had been resolved, and mentioned a few of the minor details that still needed tending.

After closing the office, Cecilia and Melinda enjoyed a leisurely meal in the hotel restaurant. They turned in early, in order to be fully rested for the activities of the following day.

The next day was filled with a bustle of activity for Cecilia – the attendees began arriving in the early afternoon, and she was quite occupied with registering their arrivals and assuring a smooth transfer to the charter plane. The jumbo jet arrived on schedule, at 9:00 a.m. For Melinda and the flight crew, the day passed slowly, as they awaited the time of departure.

They started to load the plane at 2:30 p.m. Melinda and all of the crew were in place, either on the flight deck or hostessing passengers on the main deck. The last of the passengers were on the plane, locating their seats and getting settled. Everything was working out exactly as planned. Virginia was about to close the door, and Melinda could hear the last few “clunks” of the baggage being stowed below. Cecilia had sat down in a seat just in back of the first class galley. She took a deep breath and glanced at Melinda, who was standing near the entrance to the galley. Eighteen months’ work was finally over, Cecilia reflected; the rest was up to Melinda.

“That looks like a gun!” Although he was speaking quietly to himself, the man’s voice was loud enough to be heard, and the substance of his remark electrified the air.

What the devil had gone wrong! Melinda jerked her head in the direction of the voice. In an instant, she realized what had happened. The man had been trying to stow some of his baggage in the crew’s compartment. But how in the hell had the gun gotten placed here below! Except for handguns in handbags, all the weapons were supposed to be up on the flight deck. No matter how it happened, the situation was out of control. She had to act immediately. The man had dropped to one knee, and was attempting to undo the sack that was containing all but the distinctive butt of the short automatic rifle.

Before Melinda could move, Virginia intercepted the man. She reached down toward him placing her hand on his shoulder, and said, firmly, “Don’t be ridiculous, sir. Of course that’s not a gun. That’s a flare shooter, in case of an emergency landing on the water. This is the crew’s equipment compartment. You’re not supposed to be in here. Please take your seat.” She placed her hand on his arm, in a gesture to raise him to a standing position. He glanced at Virginia, and started to get up. It appeared that he had accepted her explanation. But then he glanced back down at the butt of the weapon, apparently not totally convinced. He

glanced at the door of the plane, and back at the weapon. Evidently he had decided that he had to be sure.

“Flares are shot from pistols, not rifles,” he insisted, and, reaching down, he grabbed the butt of the rifle and lifted it and its containing sack from the compartment.

Virginia attempted to take the sack from him. “I’m sorry sir,” she said, “but you’ll have to take your seat. Passengers are not allowed to disturb the rescue equipment.”

Although neither one had yet raised his voice, the passengers in the immediate area were engrossed in the goings-on. One of them spoke up, in support of the man’s comment. “Well, why don’t you let him see it, if it’s just a flare shooter?”

The man was not to be stopped. He wrenched the sack open, exposing the rifle completely. He grabbed it. His eyes widened. As the other passenger saw it too, the cabin became charged with excitement. “It is a rifle!” he shouted. “What’s going on here? I want the police. I’m getting off the plane,” and he turned toward the door.

Some of the other passengers were standing up, evidently ready to join him. The situation was out of control. Melinda realized she had only a split second left to save it. She reached into her handbag, grabbing her .32. Pulling it out, she stepped into the doorway, and aimed it at the man. “Get back,” she ordered, “get back or I’ll shoot!”

But there was no stopping him now. Her action had totally substantiated his position, and he was determined to leave. He started to raise the rifle to his hip, to fire it. Melinda reacted instantly, firing two shots at him, hitting him in the right shoulder. The impact of the bullets stopped him in his tracks. The rifle flew from his hands, and he reeled over sideways and fell backwards on the floor.

Melinda glanced up, facing the passengers. They were paralyzed, startled by the shots, stunned at what had happened, frozen by fear of what might happen next. She had to capitalize

on their moment of shock and confusion. She reached for the automatic rifle on the floor, picked it up, and stepped back in to the doorway. “Get back in your seats, or I’ll shoot!” She aimed the rifle toward them. “Virginia, close the door,” she ordered. The passengers were still paralyzed. “Sit down!” she demanded. The immediate crisis was over. They took their seats, their eyes riveted on her rifle.

Virginia closed the door. Lydia and Fé obtained their weapons from upstairs, and joined Melinda in guarding the passengers. Melinda raced up the stairs to the flight deck. She burst into the cockpit.

“Tony, we’ve got to get out of here!” she urged Antonio, the pilot. “All hell’s broken loose – we fired some shots. We’ve got to get into the air before someone tries something else while we’re still on the ground.”

“Jesus, Melinda, I can’t take off just like that,” he protested, snapping his fingers. “I’m not yet cleared – you’ll have to wait. The baggage isn’t stowed yet.”

“Okay, okay,” she concurred. “But do what you can. We’re in trouble!” she emphasized, projecting an unmistakable sense of urgency.

“The minutes seemed like hours. Finally, the baggage was finished, and the tow vehicle began to push them backwards away from the docking bay. Melinda breathed a sigh of relief. Things were looking up.

But then, the plane stopped. The voice on the radio spoke. “November 9934, we have a report from Ground Systems that one of the ground men thought he heard two shots on the plane. What happened? Please explain.” The radio went silent.

“Jesus, what a mess,” Melinda cursed her bad luck. Tony looked at her.

“Well,” he demanded, “What do I tell them?”

Melinda’s mind raced. It had to be good. But what could explain two loud reports from a pistol? “Tell them two bottles of

champagne exploded,” she ordered, grasping for a plausible explanation. Tony relayed her message. There was a long pause. A different voice came on the radio. “November 9934, this is Airport Security. We wish to verify. Please wait.”

That was it. They had to leave immediately. In a few seconds, the large plane would be surrounded by police cars, unable to move.

“Take off,” she ordered Tony.

“I don’t think I have room to turn the plane around,” he protested.

“Well try, dammit! Or we’re lost!” she insisted.

Tony braked the right wheels, and revved the two left engines to a scream. The plane started to turn. The wing edged nearer and nearer the loading platform. Everyone held his breath. A damaged wing could spell disaster. Success! The tip of the wing cleared the dock, pushing the cloth canopy slightly aside as it swept by.

They wound down the two screaming engines and pulled back on the other two throttles, starting the plane toward the runway.

“November 9934,” the radio interjected, “you are not cleared! You are ordered to stop for verification. I repeat – you are ordered to stop!”

“Don’t answer that,” Melinda ordered.

As they rolled toward the far end of the runway, Melinda’s worst fears were realized. Three patrol cars and a truck were headed to intercept them. Tony looked at her, to verify that she saw them.

“Turn onto the main runway over there,” she pointed.

“You’re crazy. Another plane could be landing. There may not be enough runway for take-off,” Tony argued.

“Damn it!” she insisted. “We don’t have any choice. Take off!”

Tony’s eyes peered left and right for sight of another plane, and, seeing none, he rolled the big jet onto the runway, and pulled back on the throttles.

“Son of a bitch!” Melinda cursed. She could see two police cars entering the far end of the runway, and turning toward them.

“November 9934,” the control tower broke in again, “you are ordered to stop. The police cars have orders to block your path. We will shoot out your tires, if you do not comply.”

“Keep going,” Melinda ordered. The big plane was racing down the runway now, toward the two intercepting police cars. But the cars kept coming. They didn’t stop, and they didn’t turn off.

“My god!” Tony shouted. “They’re coming straight at us. We’ll crash! We’ve got no choice but to stop.” His hand moved to lower the throttle.

In a last desperate effort, Melinda drew the pistol from her handbag, and, lowering it to Tony’s head under his earlobe, stated in a calm, decisive, determined voice, “You’re a dead man either way. Keep this plane going!”

Tony obeyed. The plane was rocketing down the runway now, rapidly closing on the two cars in a grotesque game of “chicken.”

“They’re not going to turn!” Tony shouted in alarm.

“Keep going!” Melinda ordered.

Then, finally, the car to their right turned off. But the other car kept coming.

“Lift off!” urged Melinda.

“I’m not going quite fast enough!” Tony argued.

“Lift off!” she demanded.

Tony pulled back on the controls. The nose of the plane started to rise. Then, at the last minute, just before they lost sight of him, the second car veered away. But it was too late. Wham! The car hit the left wheel assembly, head on. The plane started to roll.

“God damn!” Melinda cursed. “There’s too much drag on the left side. Retract the left flaps!”

“I can’t!” Tony shouted. “I need the lift! We’ll crash either way!”

The plane rolled further, the left wing reaching near the ground. In a desperate attempt to avoid disaster, Tony retracted the flaps somewhat. The plane evened out, now flying level along the

ground. Gradually, the speed increased. They aimed the nose higher into the sky. Melinda slumped to her seat, and breathed deeply. They were off!

As they gained altitude, Tony checked out the damage as best he could. Evidently, the left wheel assembly was totally inoperable. He couldn't retract it, but apparently the damage was confined to the wheel assembly, for the plane was otherwise okay.

The radio squawked on, first requesting their return to the airport, and then simply requesting information about the situation. After they were safely airborne, Melinda instructed Tony to inform them that the plane had been hijacked. He relayed the message that they had rehearsed so many times before – Flight C290 had been hijacked by Puerto Rican separatists, they would relay their demands shortly, and no interference was to be attempted or else the plane would be blown up, sending America's top nuclear scientists to their deaths.

So much for Miami airport. Their attention turned to the passengers. If their future cooperation were to be assured, it was imperative that they sincerely believe that the Mexican government had nothing whatsoever to do with the kidnapping, save for their release.

In her seat in the main passenger cabin below, Cecilia was playing out her role as an unsuspecting victim of the plot. Fé and Aurora had ordered everyone to his seat, seat belts secured. They were brandishing their automatic weapons, one stationed at each side of the galley. "What a screw-up," Cecilia thought to herself. She was angry. She had pulled her part of the plot off – a year's effort – without a hitch, just to see the whole effort almost end in disaster. Her anger was tempered only by the relief that Melinda's fast thinking had pulled it out of the fire.

"No sense crying over spilled milk," she reflected. "Anyway, things seem to be working out just fine now."

Tony came on the air. “Ladies and Gentlemen, this is the Captain speaking. Please give me your attention,” he began. “I regret to inform you...” he paused. How dramatic, Cecilia thought to herself, somewhat sarcastically. He continued: “...that four Puerto Rican nationalists have hijacked this airplane.” There was silence, as the passengers listened with rapt attention. “They are holding the crew and passengers hostage, and demanding that we fly them to Cuba, where they will voice a demand for Puerto Rican independence, the release of several Puerto Rican and Cubans in US jails, and a ransom of five million dollars. They have assured me that if we comply with their request, no harm will come to any of us. They have also made it quite clear that if we do not comply, then they will blow up the airplane.” Cecilia observed that “you could have heard a pin drop,” as the passengers awaited further explanation.

The Captain’s voice came over the air again. “The Nationalists have requested that no one leave his seat. As you see,” he said, obviously referring to Aurora and Fé, “they are armed. Please comply with their request to remain seated. Please do not attempt any resistance. One of the Nationalists on the flight deck has a bomb, which he is prepared to detonate in the event that they lose control of the aircraft.”

The plane had not deviated yet from its original course. After a few minutes, the Captain spoke again.

“Ladies and Gentlemen,” he began, “a problem has arisen. In addition to the three demands I mentioned earlier, the Nationalists have demanded asylum in Cuba. Unfortunately, Havana airport authorities are unable – not authorized – to grant this request. We are trying to get clarification from Havana concerning this request.”

The passengers were beginning to talk to each other in low voices, since this was evidently not disallowed by their guards. The woman next to Cecilia spoke to her, in a concerned voice.

“How can this have happened?” she asked, not expecting an answer. “Why doesn’t Cuba just say that it’s granting them asylum, and then change its mind later? What if they don’t get asylum? Do you think they’ll blow up the plane?”

The woman was quite upset, and Cecilia tried to comfort her, without appearing unusually calm herself. “Flight crews are trained in procedures on how to handle hijack situations,” she explained. “I’m sure that they’ll handle it right. In most hijackings, no passengers get hurt,” she explained.

Some time passed, with no further word from the Captain. The plane did a long, banking turn, and headed west. The passengers anxiously speculated on where they were headed. Tony’s voice came back on the intercom. “Ladies and Gentlemen. The Mexican Government had agreed to let the plane land in Mexico. After we land, negotiations will continue.”

That was it. For the remainder of the flight, there were no further communications. The passengers talked in whispers throughout the flight. At one point, two people started talking in a normal voice, at which point Fé aimed her rifle straight at them, without saying a word. They stopped talking.

After a few hours, they slowed, and started circling. The passengers buzzed with speculation. Not knowing what was going on was taking its toll. In fact, Cecilia herself did not know for certain exactly what the situation was. Several alternative plans had been worked out, depending on contingencies that might arise during the kidnapping.

But why were they circling? Plan “A”, the first choice, called for a direct flight to Merida, “all-night negotiations,” followed by a “capitulation to the hijackers’ demands. The hijackers would then leave, and the passengers would be “liberated” by the efforts of the Mexican government.

Other plans called for flights to other places, but none of them called for continued circling. Then it hit her. Of course! The damaged landing gear! They couldn’t land! Tony was running

the fuel out. Jesus – what a mess! She could strangle the bitch who screwed up and put the rifle downstairs. Suddenly, the irony of her concern struck her – she had joined the passengers in wondering what would happen next. In her mind's eye, she couldn't help a wry smile at herself and the situation.

“Ladies and Gentlemen....” Her reverie was broken by Tony's voice over the intercom. “This is the Captain again. Unfortunately, as we were taking off, we damaged our landing gear. We do not know the extent of the damage. In the past few hours, we have been running out our fuel. We will now buzz the control tower at our destination, and they will visually inspect the landing gear. We will then land, either with all wheels down or all wheels up. Please prepare yourself for an emergency landing, by leaning forward and grasping your ankles as we land. The hijackers are aware of the situation, and have agreed to our plan. They insist, however, on being the first out of the plane. As passengers deplane, they are to head for the terminal building, which has been evacuated. You will still be under guard by the Nationalists, and should not attempt any rash action. It seems that the Nationalists' demands will be met. I repeat: their demands will be met. An attempted escape could accomplish nothing other than the precipitation of an unnecessary disaster.”

Tony's message had quite an impact. The passengers had gotten used to the kidnapping and seemed to reach the conclusion that it might work out all right. Emotionally, however, the situation had drained them. The message that they might all perish in a few minutes in a fiery explosion was too much to bear. They were sick with fear. Women were crying.

They flew over the control tower. Tony came back on the air. “This is the Captain again. The landing gear is badly damaged. We will attempt a belly landing on a foam base. We will land in five minutes. Please prepare yourself for an emergency landing.”

The lights went out. The big jet sank slowly toward its final landing. Cecilia looked out the windows, but it was too dark to tell

how close they were to the ground. Tony came on the air. “We will land in ten seconds. Please lean forward and grasp your ankles.”

Tony cut the engines. A moment later, they touched the runway. There was an initial impact, as the rubber tires hit the foam and runway. Instantly, the plane wrenched to the left, as the damaged wheel assembly dug into the runway. The noise was deafening, as the runway wrenched the damaged landing gear from the plane and ripped the plane’s belly apart. They skidded along the runway, somewhat sideways, but still headed forward. The metal skin and frame structure scraped over the runway, roaring in protest as the concrete savagely clawed at them like a giant grinding wheel. The rending metal parts screamed as they spent the energy of the plane’s forward motion. As they slowed, the screams of the scraping metal turned to groans, as the plane slowly skidded to a stop.

But there was no fire. Thank god! Fé and Aurora took immediate command. Fé yelled that anyone who moved from his seat before he was told would be shot. The passengers obeyed. Aurora pulled open two of the emergency exits, and ordered the passengers to leave the plane with her, evacuating the plane row by row.

Once outside the plane, the passengers were herded toward the main terminal building. As indicated, the building was unoccupied, except for the crew in the control tower. Fé, Aurora, Virginia, and Ramón guarded the passengers. Tony and the rest of the crew sat with the passengers, playing out their roles as innocent and unwilling victims of the kidnapping. Melinda returned to the vacated office of the airport manager, to “negotiate” the release of the passengers.

XIV. KALEIDOSCOPE

Colorado Springs, Colorado...

“Well, it looks as if everything is ready to go, then,” Carmen concluded. “You have the codes, the winds are right, and the plane is scheduled to leave Miami at three o’clock this afternoon.”

She and Dom had gone over all the final details. Everything was ready. A year’s hard work was about to bear fruit. Dom had manned the transmitter/receiver outside of Colorado Springs from the day that Carmen had arrived. At first, his role had been to intercept and decode the automated secure voice communications messages, transmitted to Cheyenne Mountain by microwave. It was Dom who regularly intercepted the code numbers required to initiate the attack. And it was Dom who would telephone the attack commands to NORAD, simulating the three initiators’ voices through the use of the spectrum-emulating voice filter.

More recently, Dom had received day-to-day and hour-to-hour information on the upper-atmospheric winds near the Mexican border. It was summer, and they were generally headed from east to west. As zero hour neared, Dom had received satellite scans of cloud movements over the Pacific. Everything was perfect for tonight. No major disturbances, and a regular movement of air over the southwestern US.

“Is the plane ready to go?” Carmen asked, referring to the plane that was waiting just outside, in which they would leave for Mexico after initiating the attack.

“Sure is,” Dom replied. “All tanked up and ready to go.”

“Okay, then, let’s do it!” Carmen gave the go-ahead. “As soon as we get word that the plane in Miami is in the air, let’s initiate.”

It was noon. The plane in Miami should be taking off before long. As soon as it did, Dom would initiate the attack. The three calls would take about twenty minutes to make. He would set the attack up for 9:00 p.m. As soon as the attack was set up, he and Carmen would leave in the plane for Tucson, to pick up Dr.

Campbell in the late afternoon. After picking up Campbell, they would leave for Mexico City.

Suddenly and simultaneously, Dom and Carmen heard a noise outside. Carmen moved to the window. "Oh my god!" she exclaimed, her tone more reflective of disappointment than alarm. It was Julie Torgenson. "What in the hell is she doing here?" Carmen muttered, stepping quickly to the door. "Damn!" It occurred to her. "That jealous bitch," she turned to Dom. "She's evidently spying on me, thinking I'm off on a noontime tryst with her husband."

Carmen and Dom ran out the door and onto the porch. Julie had to be stopped. There was no telling what she might have heard, if anything. Probably nothing, Carmen reflected, since the front door had been closed, but she couldn't take any chances.

As Carmen stepped down the porch steps, Julie was opening the door to her car, looking straight at her and Dom. She obviously was leaving as fast as she could, having compromised her position.

"I'll stop her," Carmen heard Dom say, from behind her. She glanced back. Dom had his .38 in his right hand, lowering it in aim at Julie.

"No, wait!" exclaimed Carmen, in a gut reaction. The sensation that gripped her solar plexus was one of pure emotion – part pity, part repulsion, and anger at herself and the situation. She had taken this woman's husband; she couldn't take her life as well. "Don't shoot her! We'll catch her instead."

Dom was surprised. The rational response to the situation had been clear. "You're jeopardizing the entire mission!" he insisted. But Carmen was in charge, and she glared at him and said, "Do as I say! We'll just have to catch her. Get in the car."

"Damn!" Carmen cursed at herself. From the perspective of the mission, Dom was right, of course. This was stupid. Women are just too softhearted to make good spies, she thought to herself, half in self-condemnation, half in rationalization. But she –

Carmen – was her own person, and, in the final analysis, accountable only to herself.

“Lord deliver me from jealous wives,” she thought to herself, as she slipped behind the wheel and unlocked the door for Dom. “Why did Julie have to follow her? There was never a case for a wife’s checking up on an errant husband. If he was dutiful, there was no need, and if he cheated, he wasn’t worth the trouble.”

Julie was obviously frightened. She had seen the gun and was traveling over the dirt road at breakneck speed. Carmen had little doubt, however, she would catch her. Julie’s compact sedan was no match for her Mercedes 300 SL sports coupe. She pressed the pedal until she could see that her car was closing on Julie’s. It was four miles to the highway – plenty of distance in which to catch up and force Julie’s car off the road.

“Look out!” Dom yelled. But it was too late. An instant later Carmen’s right fender resounded with a hard, loud “wham,” as she struck a large ewe that had darted onto the road.

“Son of a bitch!” Carmen cursed her bad luck, as she lost control of the car. The ewe had evidently crushed the fender into the tire, and the coupe steered sharply to the right. The car skidded sideways on the loose gravel for an instant, before slamming into the shallow ditch alongside the road. The car hit the ditch hard, and the force of impact ricocheted it into the air. The car sailed into the air, and, still traveling at a high rate of speed, came crashing down in the open field along the side of the road. Fortunately, the field was smooth, and the car skidded half-sideways to a stop. Shaken, Carmen loosened her grip on the wheel, and turned to Dom. “Are you okay?” she asked.

“Jesus!” he exclaimed, obviously shaken himself and evidently unhurt.

“Let’s go,” she said, as she opened the door and stepped out of the car.

“We’re in a hell of a fix now,” Dom exclaimed. “She saw the gun and will no doubt call the police. We’ve got to get out of here.

But wait – the voice emulator is back at the house. Without that, we're lost. God damn it!" Dom cursed. "I knew we should have stopped her back at the house!" The situation was so bad, he couldn't resist the "I told you so."

Carmen was quite aware of the gravity of the situation, and didn't need to be reminded. She had it coming, though. The screw-up was totally her own making. But so what? All that mattered was to respond to conditions as they were now.

"Stop crying in your beer, dammit," Carmen ordered, as she assessed what had to be done. Clearly, they had to retrieve the emulator. "Let's go back, get the emulator, and get out of here."

As they ran back to the house, Carmen pondered what their course of action should be. They didn't have time to place the telephone calls to initiate the attack – Julie probably would call the police. If the initiating calls were interrupted, the entire mission would be ruined. Instead, they had to get out of here, and initiate the attack from a safer place. But Julie could identify her. If she in fact did call the police, the roads and airports would be blocked. The plane! – they could still get out in the plane! But if the police were on their toes, they would be forced down. It was, however, a safer bet than Dom's car.

But wait! What if Julie called Sam? If she had heard anything significant suggestive of espionage, and told Sam, then he would have no choice but to act. Clearly, Sam had to be diverted. She had it! Sam would fly them out of here, in a trainer! He had access to a trainer at all times. Even if Julie called the police, the military airport would not be involved. Julie was an intelligent woman, but, more importantly, she was protective. If she had overheard something important, she would consider the impact on Sam and Sam's career, before considering the impact on the US. Nothing that Dom and she had said could suggest the enormity of the plot. It was a safe bet! As long as Julie couldn't reach Sam, they were relatively secure.

She reached the house, and headed for the phone. After catching her breath, she dialed Sam's number. What luck! He was eating in today.

"Sam!" she began.

"What is it?" he queried.

"Sam, I'm in trouble," she paused for a moment for him to respond.

"What's the matter?" he asked.

"Well, Julie followed me at lunch today. You remember my brother, Dom?" she paused.

"Yes?"

"Well, I never told you this, but he's in trouble with the law. He smuggled some marijuana up from Mexico in his plane. I had to see him today at lunch, and Julie showed up. He saw her spying on us, and, not knowing who she was, he pulled a gun. She saw the gun and left. I'm sure she knows something's wrong, and will call the police," Carmen paused again.

"Well, what the hell's going on?" Sam demanded. "Why are you mixed up with Dom? Why did you visit him if you know he's in trouble?"

"Sam, I didn't want to tell you, but I'm afraid you've gotten me pregnant," she lied.

"What? Oh, Jesus! But what has that got to do with Dom?" Sam asked.

"Well, he has a plane. I was going to ask him to fly me to Mexico for an abortion," she explained.

"Why? Why don't you get an abortion here?" Sam asked.

"Oh, I don't know. A friend of mine got one here, and she said it was humiliating. She had to pay a psychiatrist \$300 to certify that she needed the abortion, and he laughed at her when she complained at the rip-off," Carmen explained.

"Jesus, Jesus, Jesus," Sam repeated. "So what's next? What can I do?" he asked.

“Sam, if Julie goes to the police, we’re all in trouble,” she insisted.

“Why? It seems that only Dom is in trouble,” Sam argued.

“Well, I told him the child was yours. I’m afraid he’s not so big on character or secrecy. If we end up in a trial, he’ll blow the whole thing wide open.”

“Oh my god,” Sam muttered, expressing his distaste for the messy situation that was developing. “Look, what can I do? It sounds like the thing’s out of my hands,” he added.

“Sam, if you could fly us to Tucson, Dom will disappear, and I’ll head for Mexico for a while. You’ll simply have to tell Julie to forget the whole thing,” Carmen insisted.

Sam paused for a moment. What a mess, he thought to himself. But Carmen was right. Much as he didn’t like aiding a fugitive, his career and his family were ruined if this mess were made public.

“Damn it!” he cursed. He did not like not losing control of a situation. “Okay,” he reluctantly agreed. “I’ll fly you down. Where can you meet me?”

“If you clear it with the base, we can fly in in about twenty minutes. We’ll wait there till you arrive. When will you be there?” she asked.

“I’ll be there in about half an hour,” he said, his tone reflecting his irritation at the proceedings.

“Sam?” she asked, pausing for his response.

“What is it?” he grumbled.

“I’m sorry.”

It suddenly dawned on him that he had “gotten her into trouble.” In spite of the developments that had occurred, it was his child, and his wife, who had essentially caused the problem. He was being a selfish bastard.

“Forget it, Carmen, I’ll do whatever I can. I’ll see you at the base,” he responded, and placed the receiver back in the cradle.

Carmen slumped into the chair. It worked. But she couldn't stop now. They had to get to the base.

"Do you have the emulator?" she asked Dom.

"Yes," he responded. "It's here in the case."

"And the codes?" she queried. He nodded.

"Okay, then let's go," she ordered. "We'll take the plane."

Waving her hand at the transmitter, she instructed, "Blow this stuff up. I'll get the plane warmed up."

As they taxied along the runway back to the terminal, Carmen could see Sam waiting for them. She rolled the plane to a stop in front of him, and cut the engine. As she stepped down from the cockpit, Sam greeted her. "Hi," he said, smiling softly. Having accepted the situation and the solution, he was in a better humor than when she had talked to him on the phone.

The flight to Tucson was quiet. Carmen sat in the cockpit next to Sam; neither one had much to say. She reflected that their relationship was clearly a luxury he could no longer afford, but he didn't want to face this conclusion. His wife clearly had the upper hand at this point. Depending on what she said and did, Carmen would or would not be in a lot of trouble. And obviously, Julie would use the situation to full advantage. Yes, their liaison was over.

"Son of a bitch," he muttered to himself, reflecting on his loss.

They arrived in Tucson at four o'clock. Carmen insisted on saying goodbye at the airport. She and Dom had a great deal to do, and she could not afford to have Sam around. Dom had to initiate the attack, and she had to pick up Dr. Campbell. She and Dom headed for a nearby motel. Dom called Miami, and verified that the plane had taken off. He started the attack initiation procedure. Thirty minutes later, he had pulled it off. The attack was set for 9:00 p.m.

Carmen placed a call to Campbell's office. She asked to speak to Dr. Campbell. Carmen had talked with him a couple of weeks earlier, about his doing some consulting in Mexico. She had arranged to pick him up today.

Sr. Carrera had briefed her on Campbell's role, as the man who had originally identified the threat of the MX system to Mexico. Out of a sense of gratitude for Campbell's serendipitous discovery, Dr. Carrera had decided that he would invite Campbell to Mexico just before the exchange. Campbell would never learn of the role his finding had played in the development.

"Dr. Campbell?" Carmen asked, "This is Carmen Mirenda."

"Yes, how are you?" he asked politely.

"I'm fine. And you? As we discussed a couple of weeks ago, I'm here to pick you up for your visit to Mexico. Are you ready?" she inquired.

"Well, actually, no," he replied.

"I don't understand. What do you mean?" Carmen asked.

"Well, one of my major clients has asked for a special briefing tomorrow. He's a 'bread and butter' client, if you know what I mean. I simply can't afford to say 'no' to him. We'll have to wait until tomorrow evening to leave."

"Damnation," Carmen commented to herself. This was one hell of a day for problems.

"Dr. Campbell, I'll be right over to see you," she said, hanging up before he had a chance to respond.

"I'm here to see Dr. Campbell," Carmen explained to the receptionist. "He expects me."

"Yes, please go on back to his secretary. She will help you."

Carmen walked down the hall to the back of the building. Dr. Campbell's secretary was seated at her desk, outside of his office. As Carmen approached, the woman looked up. Carmen was "dressed to kill." She had on a sleek black dress, short sleeves, cut low, and hemmed high. Her only decoration was a

large silver brooch in the center of her dress, at the vee. Campbell's secretary was "as cold as ice." "Let's see who wins this round, honey," Carmen thought to herself, as she bristled slightly at the cool reception.

"I am Carmen Mirenda. Dr. Campbell expects me. May I go in?" she asked.

"Wait here," the secretary replied, deliberately not bothering to ask her to be seated.

She walked to the door, opened it, stepped inside, and closed the door. A few moments later, the door opened, and she stepped out.

"Dr. Campbell will see you know," she said coolly.

"Thank you," Carmen replied, as she walked through the door, closing it behind her.

Campbell was seated at his desk, working on some papers. As Carmen walked in, he glanced up. He reacted visibly to her good looks, as a wide smile filled his face.

"Why, Miss Mirenda," he stumbled for words. "It certainly is a pleasure to meet you face to face."

He continued smiling as he stood up, walked around his desk, and extended his right hand to greet her. "Won't you be seated over here on the sofa," he offered. "I'm sure you'll find it more comfortable."

"Why thank you very much, Dr. Campbell," Carmen replied, returning his smile with her own, eyes flashing.

"I'm so sorry I didn't get back in touch with you, Miss Mirenda," Campbell began, "but as I explained to you on the phone, I simply can't leave until tomorrow."

"Dr. Campbell, I'll be very straightforward with you. Your leaving for Mexico this evening is very important to Dr. Carrera. I do not know what is the nature of your visit, but he expressed to me personally that it is a matter of grave importance. If you do not accompany me this evening, I am afraid that Dr. Carrera will be most upset with me. He had ordered me to return to Mexico

this evening with you, without fail.” Carmen paused, smiling invitingly at him. “Dr. Campbell,” she continued, speaking softly and glancing at the floor and then back at him, unmistakably connoting that she was about to suggest something improper, “I will be ever so grateful if you would accompany me in my plane this evening on my return trip to Mexico.” She paused, batting her eyes a few times, waiting for his response. It was perfectly clear what she was suggesting.

“Uh, well, uh,” he began. You poor helpless bastard, Carmen thought to herself. I’ve got you by the balls, she mullied. Men! What helpless creatures! She pictured Campbell in her mind’s eye as a poor little puppy dog, his tongue hanging out of his mouth. “Why,” he continued, “perhaps I could delay the briefing a few days.” His smile widened. Carmen moved her shoulders slightly forward and back, distracting Campbell with her comely breasts. She smiled demurely. He glanced at her breasts, at her lap, at her legs, and back at her eyes. He laughed. “Yes, I don’t see why the briefing can’t be delayed. When do we leave?”

“The plane is at the airport right now,” Carmen responded. “We should leave before nine o’clock. Could you meet me at 8:30?”

“Fine, I’ll meet you at 8:30 at the airport,” Campbell agreed, as he opened the door for Carmen. He spoke to his secretary. “Carole, something very important has come up. I have to leave for Mexico this evening. Would you please get Paul on the line? I’ll have to cancel.”

Carole was obviously angry. Carmen smiled at her, delighting in this minor conquest. Carole was evidently no fool, and was furious at this strange woman’s interference. “Dr. Campbell, you know he’ll be very upset if you cancel. They’ve invited the Advisory Group to the meeting. You simply can’t cancel like this at the last minute,” she insisted. Campbell was obviously uncomfortable. Carmen decided it was time to leave.

“I’ll see you at 8:30, Dr. Campbell,” she concluded. She turned to the other woman, smiled, and added, casually, “So nice to have

met you, my dear,” in an every-so-slightly-patronizing manner. Without waiting for a response, she turned and walked confidently down the hall, her hips shifting slightly as she walked.

“Lecherous bastard!” she laughed to herself, as she halfway wished she could be there to see Carole rake him over the coals.

Campbell was right on time: 8:30 on the nose. Carmen sighed in relief as she saw him coming. Finally, things were going smoothly for a change. She ran to greet him, wrapping her arms around his. “I’m so glad you were able to make it, Dr. Campbell.”

“My friends call me Jack,” he insisted, smiling, as they walked to the plane.

“Were you able to work things out with Carole?” Carmen asked in ostensible innocence, delighting in his slight discomfort. He rolled his eyes.

“Well, I guess,” he laughed.

They entered the plane. Dom was at the controls. They had leased a new executive jet. It was luxuriously appointed. Carmen and Jack took a seat, and chatted as they waited for take-off.

Finally, they were airborne. As they leveled off, Carmen prepared a drink for herself and for Jack. She turned off the lights. The full moon cast a soft white glow on the interior compartment of the plane.

As she sipped on her drink, she looked closely at Jack. He was handsome, with slightly devilish eyes, graying around the temples, a dark tan, a tall muscular build. He was wearing a white short-sleeved shirt, with the top two buttons undone, exposing his hairy chest. So this was the man who started it all, she mused, rolling the ice around in her glass, head tilted slightly forward, her eyes looking straight into his. Frightfully bright, Dr. Carrera had told her. She had hardly met him, and she wondered what sort of personality he had. He seemed pleasant, easygoing, and quite sure of himself. He was returning her stare. His face

broke into a smile. He put his drink down. He moistened his lips slightly with his tongue.

[Abridgement 5. As Carmen and Dr. Campbell enjoy the evening flight toward Mexico, the night sky is suddenly lightened, several times in succession, by the flashes from distant thermonuclear explosions. The counterattack was on. The US was being destroyed by a massive barrage of nuclear explosions.]

The plane streaked through the quiet night sky, the soft glow of the moon reflecting brightly on its smooth skin. She slept in his arms as they slipped deeper and deeper into Mexico, approaching the dawn of a new era. Miles below and behind them, a sleeping world was in ashes, waiting like the phoenix to rise anew, reborn and strong, in a new circle of life.

XV. BUST TOWN

The sleek missile streaked noiselessly through the sky, high above the atmosphere. It had just passed the Arctic Circle, on its ballistic trajectory over the pole. Below and to the right, the blue and white crescent of the sunlit portion of the planet shone brightly. As the missile passed over northern Canada, separation occurred. One by one, each of the ten independently-targetable reentry vehicles (MIRVs) separated from the mother booster and headed on its way to its own specified target. Reentry vehicle number six (RV6) was one of the later RVs to be released. It had a long way to go: its programmed target was MX site 327, located just outside of Buzzard Flats, in the southwestern United States.

A few minutes later, on its downward path, RV6 plunged into the atmosphere, about a hundred kilometers north of Buzzard Flats. Speeding through the atmosphere at tremendous speed,

the nose of the forty-kilo reentry vehicle quickly heated up, now glowing as it streaked toward its destination. Second by second, the distance to its target narrowed: 100 km, 90 km, 80 km.... Then, just a few hundred meters above its target, the radar altimeter signaled for detonation. The sphere of explosive charges ignited, compressing the fissionable material into a supercritical mass. Then, in less than a microsecond, the fission-fusion-fission reaction was accomplished. The reaction released a violent burst of energy – tens of millions of degrees – in a brilliant flash of electromagnetic radiation and neutron release. Within a millionth of a second, the products of the thermonuclear reaction heated the surrounding air into an immense fireball. A few milliseconds later, the fireball touched the earth, instantly vaporizing the missile site, consuming thousands of tons of concrete, steel, soil, and rock. As the fireball spread, it spawned a high-pressure shock wave. The shock front moved out quickly from the fireball, traveling along the ground. Ten seconds later the fireball, now about two kilometers in diameter, was rising rapidly into the clear night sky.

Below, on the ground, the shock front continued on its relentless path across the desert, an invisible juggernaut destroying everything in its path. As the front reached Buzzard Flats, only a few kilometers from the missile site, the blast winds were traveling several hundred kilometers per hour. The overpressure at the shock front crushed the buildings of the town, and the blast winds scattered the fractured debris. The intense thermal pulse from the detonation had seared the exposed surfaces of the town's many wooden structures, and several fires had begun.

A few kilometers farther away, on the low hill overlooking the town, lay the palatial estate of the owner of MX Industries. Tired from a long day's work, Cal and Cassie had just turned in for the night. Cassie had just turned the lights out. Cal was lying on his back with his hands behind his head, staring at the ceiling,

making a few plans for tomorrow. Cal had noticed the reflected flash a few seconds earlier and puzzled at the lightning, when the sky had been so clear earlier.

As the shock front traveled up the hill to the house, the fireball, still luminous, had risen hundreds of feet into the air. The shock front smashed into the house. The five-psi peak overpressure shattered all of the windows, fractured the tiles on the roof, and ruptured the walls and ceilings.

“Holy shit!” Cal exclaimed, as the blast front hit the house. Immediately following the blast front, the blast winds – still over one hundred kilometers per hour – ripped through the house. After about three seconds, the compression phase of the blast wave ended. The wind dropped to zero. Cal sat up in bed. He was dumbfounded. What had happened, he wondered. He had felt the peak overpressure of the blast wave, and deduced that an explosion had occurred.

“What in the hell is going on?” he said out loud, turning his head toward Cassie. As the pressure of the blast wave sank below atmospheric pressure, the transient wind began to blow backwards, toward the fireball. The shock front had weakened the house substantially, and the suction phase of the blast wave virtually ripped the house from its foundation.

Their heavy water bed had been unaffected by the explosion, but the house over their head was no more; above them was the open sky. Before them, they could see the fireball, still very slightly luminous, rising into the clear night sky.

“Holy shit!” Cal exclaimed again, as the realization of what had happened struck him. “They blew the damned thing up!”

“What, Cal, what’s going on?” Cassie asked.

“The MX. The MX site. They must have blown it up!”

For a few moments, Cal and Cassie sat there, watching the mushroom cloud forming overhead. Then, all of a sudden Cal jumped out of the bed. He moved through the debris as quickly as he could to what was left of the next room, which had been his

office. There were a few boxes still remaining in one corner, and Cal started searching through them. Unable to find what he was looking for, he leafed through the papers faster and faster.

“Damnation,” he said. “Where are those blasted things?” he muttered.

Cassie became alarmed at his unusual actions. “What is it, Cal? What’s the matter? Are you hurt? What are you looking for?”

Cal gave up his search and sat down on the floor, resting his back against one of the boxes. Looking over at Cassie, he explained the source of his frustration. “I can’t find the damned federal disaster grant application form!”

XVI. THE THIRD WORLD WAR

Prelude

Prophecies of Nostradamus

A little before the sun sets,
War shall rage, a great people shall lose faith,
The seaports shall not respond,
Bridge and Sepulchre shall be in two strange places
Nos. I:37

In a climate opposite to the Babylonian,
Great will be the effusion of blood,
Land, sea, air and sky shall be unclean,
Sects, famines, dictatorships, plagues, and disorder.
Nos. I:55

The Gods shall make it seem to men,

That they are the perpetrators of a great war,
In a sky once serene, sword and lance,
Toward the left hand shall affliction greater be.

Nos. I:91

In two houses the fire shall burn by night,
Many shall suffocate and burn,
Near two rivers for certain it shall occur,
The Sun in Sagittarius and Capricorn, all shall be subdued.

Nos. II:35

After great human transformation, still greater changes
approaches,

The great force shall renew the centuries,
Rain, blood, milk, famine, fire, and plague,
In the sky, long shining beams are seen.

Nos. II:46

The heavenly missile shall make its course,
Many die mid-sentence, a great execution,
Stones cast in trees, a proud people vanquished,
Mankind cries, the beast shall be purged in expiation.

Nos. II:70

One day the two great masters shall be friends,
Their great power shall grow,
The New Land shall be in its glorious days,
To the Bloodthirsty One, the number shall be repeated.

Nos. II:89

At sunrise a great fire shall be seen,
Noise and light in the north,
Within the sphere death and cries shall be heard,
By sword, fire, and famine death shall attend.

Nos. II:91

Fire, the color of gold, from sky to earth seen,
Cast from the mighty, a spectacular event,
Great human murder, great loss of the young,
A spectacle of death, the proud shall escape.

Nos. II:92

When those of the arctic pole unite together,
In the Orient shall be great terror and anguish,
One newly chosen shall sustain the great church,
Rhodes and Byzantium shall be tainted with barbarian
blood.

Nos. VI: 21

At five and forty degrees the sky shall burn,
Fire shall descend upon the great new city,
Instantly a great flame shall disperse,
When the Normans are required to attest.

Nos. VI:97

The horrible war shall be plotted in the Occident,
In the following year shall come the pestilence,
So terribly severe that neither young nor old nor beast
shall escape,
Blood, fire, Mercury, Mars, Jupiter in France.

Nos. IX:55

Sun in the 20th of Taurus (10th of May), so strong shall the
earth quake,
The great theater, filled, shall be destroyed,
The air, sky, and land it shall so obscure and trouble,
That nonbelievers shall implore God and the Saints.

Nos. IX:83

The earthquake, so great in the month of May,
Saturn, Capricorn, Jupiter, Mercury in Taurus,
Venus also, Cancer, Mars in Zero,
Then shall fall hail larger than eggs.

Nos. X:67

In the year 1999 and seven months,
From the sky shall come a great King of Terror,
To revive the great King of Angolmois,
Before and after, the God of War shall happily reign.

Nos. X:72

Michel de Notre Dame
(1503-1566)

Revelations of John of Patmos

And I beheld when he had opened the sixth seal, and lo,
there was a great earthquake; and the sun became black as
sackcloth of hair, and the moon became as blood:

And the stars of heaven fell unto the earth, even as the fig-
tree casteth her green figs, when she is shaken of a mighty
wind. (Rev. VI:12-13) And the angel took the censer, and
filled it with fire of the altar, and cast it upon the earth: and
there were great voices, and thunderings, and lightnings,
and an earthquake.

The first angel sounded, and there followed hail and fire
mingled with blood, and they were cast upon the earth: and
the third part of trees was burnt up, and all green grass was
burnt up. (Rev. VIII:5,7)

And the four angels were loosed, which were prepared at
an hour, and a day, and a month, and a year, for to slay the
third part of men.

And the rest of men which were not killed by these plagues yet repented not of the works of their hands that they should not worship devils, and idols of gold, and silver, and brass, and stone, and of wood: which neither can see, nor hear, nor walk:

Neither repented they of their murders, nor of their sorceries, nor of their fornication, nor of their thefts. (Rev. IX:15,20,21)

And the temple of God was opened in heaven, and there was seen in his temple the ark of his testament: and there were lightnings, and voices, and thunderings, and an earthquake, and great hail. (Rev. XI:19)

And he gathered them together into a place called in the Hebrew Armageddon.

And the seventh angel poured out his vial into the air; and there came a great voice out of the temple of heaven, from the throne, saying, It is done.

And there were voices, and thunders, and lightnings; and there was a great earthquake, such as was not since men were upon the earth, so mighty an earthquake, and so great. And the great city was divided into three parts, and the cities of the nations fell: and great Babylon came in remembrance before God, to give unto her the cup of the wine of the fierceness of his wrath. And every island fled away, and the mountains were not found.

And there fell upon men a great hail out of heaven, every stone about the weight of a talent (about forty kilos): and men blasphemed God because of the plague of the hail; for the plague thereof was exceeding great. (Rev. XVI:16-21)

And upon her forehead was a name, written, Mystery, Babylon the Great, the Mother of Harlots and Abominations of the Earth. (Rev. XVII:5)

Therefore shall her plagues come in one day, death, and mourning, and famine; and she shall be utterly burned with fire: for strong is the Lord God who judgeth her.

And the kings of the earth, who have committed fornication, and lived deliciously with her, shall bewail her, and lament for her, when they shall see the smoke of her burning.

Standing afar off for the fear of her torment, saying, Alas, alas! That great city Babylon, that mighty city! For in one hour is thy judgment come.

And the merchants of the earth shall weep and mourn over her; for no man buyeth their merchandise any more. (Rev. XVII:8-11)

The merchants of these things which were made rich by her, shall stand afar off, for the fear of her torment, weeping and wailing,

And saying...

For in one hour so great riches is come to naught. ...Alas, alas! That great city, wherein were made rich all that had ships in the sea by reason of her costliness! For in one hour is she made desolate.

Rejoice over her, thou heaven, and ye holy apostles and prophets; for God hath avenged you on her.

And a mighty angel took up a stone like a great mill-stone and cast it into the sea, saying, Thus with violence shall the great city Babylon be thrown down, and shall be found no more at all. (Rev. XVII:15-24)

John of Patmos

Merida, the Yucatan Peninsula...

Melinda walked across the lobby toward the area where Cecilia and the rest of the passengers were seated. She had a worried

look on her face. It occurred to Cecilia that Melinda was a good actress. She couldn't tell whether this was part of the act, or whether something was genuinely wrong.

It had been a long night. They had landed at nine o'clock, and it was now five in the morning. Many of the passengers had curled up on the floor and gone to sleep, but some of them could not sleep, worried over their fate. The sky was just beginning to lighten outside.

Melinda stopped a few feet from the passengers. Those who were awake watched her; it was obvious that she was about to speak.

"Ladies and Gentlemen, give me your attention. I regret to inform you that last night your country was destroyed in a nuclear war." She paused. Some of the passengers expressed shock, but most of them evidently did not believe what she was saying. "I have been listening to the short-wave radio for most of the night. Whether you wish to believe me or not is your choice. With this new development, our primary demands have either been met, are no longer relevant, or no longer achievable. In any event, the Mexican government has expressed concern for your safety, and has granted us access to a plane and safe passage from here. As insurance, we will be taking the pilot and copilot as hostages."

As she spoke, a small jet plane was taxiing along the runway, toward the terminal building. Melinda and the others moved toward the front door of the terminal. They were still brandishing their automatic weapons – Fé and Aurora pointing their rifles toward the passengers, Elena and Lydia pointing theirs at Tony and Carl. Cecilia and the passengers watched as they walked quickly away from the terminal building and toward the waiting plane. Nobody made a move. It seemed that they were afraid that something might happen, that the hijackers might stop their plane, get off, and come back. They watched as the plane taxied to the end of the runway, turned around, accelerated down the runway, and roared into the lightening sky.

Suddenly, all the pent-up emotions were released. The passengers voiced a collective cheer, hugging each other, overjoyed at their good fortune.

As they reveled in their freedom, an official car pulled up toward the terminal building door. The uniformed police officer stepped out, and walked briskly over to the door. Everyone huddled around them as they entered through the doors.

The passengers spilled out their joy at being released to the police, in a cacophony of appreciative comments and questions. One man said in a half-joking way, expecting a negative response, that the hijackers had told them that the US had been attacked. The policeman glanced toward the man, raising his eyebrows slightly. He didn't smile, and he didn't speak. The man was surprised at the response. "Well, it's not true, is it?" he asked.

"I'm afraid, sir, that it is," he said, in dead seriousness. A hush fell over the group.

"What happened?" someone asked. Several others repeated his query.

"Results are still sketchy, but it appears that the big war finally happened. The US appears to have suffered massive damage. There are reports that Europe was also largely destroyed. We don't know about Russia."

"Oh my god!" one of the passengers exclaimed. "How could it have happened!" someone asked. "What about Princeton? – and New York?" others asked.

"Hold on, hold on," he protested. "I know hardly any more than you do at this point. I can tell you, however, that Mexico is unaffected by the attack. We sustained no damage. Also, the Mexican government is aware of the fact that you are talented nuclear scientists. The government has ordered me to extend to you an offer to stay in Mexico. As you are aware, we have a major fusion energy research laboratory here in the Yucatan, including one of the world's largest neutral beam accelerators.

You are invited to review our facilities here, and to stay, if you wish.”

“No, no!” a woman said. “We want to go home.”

“I am afraid, Madam,” the officer replied, in a consoling voice, “that you have no homes to return to. From the limited amount of information we have at this time, it appears that most of your major cities were destroyed, and that your lands have been laid waste with radioactive debris. If you wished to return home, you would walk, and you would surely perish.”

The group was stunned. They turned to each other, expressing their shocked disbelief and confusion.

The officer continued, “By the way, who is in charge of this group?” he asked.

Cecilia stepped forward, “I am sir. I am Cecilia Velasquez, director of the conference.”

“Sra. Velasquez,” he began, “the government has arranged transportation to the Nuclear Research facility, located south of Merida, for you and your group. There are accommodations there for you to recover from your trying ordeal. Also, you will receive more details on the situation, as it becomes known. The busses will be ready in about an hour to transport you. Until then, we have arranged for a breakfast snack to be served. If you have any questions, please do not hesitate to ask me. I will be located in the office down the hall,” he said, pointing to his right.

The group was in a collective state of shock. They could not accept the monstrous proportions of the situation that the officer had described. One woman commented on their having escaped the tragedy. Another responded, “And our families! We’re together! Thank god we were together.”

At eight o’clock, the busses arrived. The group boarded. Cecilia reflected on their mood and manner. They were defeated. They hardly spoke to each other, except for the most basic purposes and for somewhat bewildered commentary on their

plight. It would take some time for them to adjust to the new situation.

Mexico City...

“I can’t believe that their defense system was so ineffective!” the President exclaimed, as he examined the large electronic map of the world on the front wall of the War Information Center. “The US war machine was so powerful. The damage it could inflict was terrifying. But it totally failed to protect the US from destruction at the hands of its enemies. What happened?” the President asked, turning to the Chief of Staff.

“Well, sir,” the Chief of Staff began, “it appears that during the attack the US suffered a massive power failure. A major portion of their ballistic missile defense system drew power from their commercial power network, and they evidently overloaded it. The whole system collapsed, leaving them completely defenseless – the other components of their ballistic missile defense system were evidently just as ineffective. Apparently, they succeeded in destroying only the first few Russian warheads.”

“How could such a catastrophic failure occur?” the President asked.

“Well, the government had originally planned to have an independent power source at each of their ballistic missile defense installations – a fission nuclear reactor, eventually to be replaced by a fusion reactor. But the citizens raised such a fuss over the danger of radiation contamination in the event of a reactor mishap that the government never installed the reactors. You know, it’s really ironic – the demonstrators succeeded in vetoing the fission reactors out of fear of a minor radiation accident, but because of the lack of independent power sources, most of their country has been reduced to a radioactive wasteland.”

“Incredible, just incredible,” the President remarked.

Juan listened as the President was briefed by the Chief of Staff on the details of the war. A week had passed now, and the scale of the destruction resulting from the exchange was becoming clear. The wall map had lights representing the major population, industrial, and energy centers of all the countries of the world. A blue light indicated that the center was undamaged; a yellow light indicated light-to-moderate damage; and a red light indicated heavy damage or total destruction. In addition, a very fine grid of red pinpoint lights covering the entire land area, and glowed red with intensity proportional to the radioactive level, bright red indicating lethal levels of radiation.

The Northern Hemisphere of the world glowed red. Mexican military information specialists were beginning to piece together what had happened, based mainly on satellite observations, supplemented by some overflights and scattered communications. What evidently had happened was this. The US first-strike was a counterforce attack, aimed essentially at Russian military targets. Although the bulk of the total attack throw weight had come over the pole, a substantial portion had been launched from the Pacific, and in particular from points south of China. Russia responded to the attack in full force, but with a combined counterforce/countervalue attack aimed heavily at the US and Western Europe, but also with numerous other points in the Near and Middle East, Japan, China, and Korea. China, in turn, fired heavily at Russian cities, and at some targets in India and Southeast Asia – once again cities. Russian shots were “dirty” (heavily radioactive), with numerous surface bursts on military targets. The Chinese bursts were mainly surface bursts.

What it boiled down to was the following. The Northern Hemisphere of the earth was essentially destroyed. The major cities were gone, and much of the agricultural land was heavily contaminated. The civilizations of the US, Canada, Europe, and Northern Asia were destroyed! In contrast, the Southern Hemisphere had survived the war unscathed. In the western

hemisphere, Mexico, Central America, and South America were intact. Africa was intact. Australia was undamaged. India was lightly damaged. Malaysia was undamaged except for two bursts on military targets in the Philippines – Clark Air Force Base and the Subic Bay Naval Base. On the wall map, there were few blue lights remaining on the Northern Hemisphere, and much of it glowed red. In contrast, the Southern Hemisphere remained as it had before.

With regard to Mexico, the situation had turned out very favorably. The major US West Coast cities had been hit, but the major cities of the Border States were largely intact. After the US had fired its MX salvo, there were essentially no longer any military targets in the southwestern US. Evidently, however, this fact was lost on the Russians, for they targeted practically every single MX site with their MIRVs. Through a tragic planning error, the US had located many MX sites near small towns in the Southwest, in order to have living accommodations readily available for the MX system construction crews. Even more tragically for the towns' inhabitants, with their missiles fired they no longer represented targets worth defending to the US defense system, and no defense forces were "wasted" on their defense. These towns were now gone, and much of the agricultural land in the Southwest was interdicted. The Great Plains had been affected somewhat by fallout from the MX hits and from a few direct hits. The eastern and northern portions of the US were no longer viable – massive destruction of cities, and extensive fallout.

Politically, the world fell into three major divisions: Australia and Malaysia; Mexico and Central and South America; and South Africa. In the week that had followed the exchange, these major world powers had exchanged some "information" messages, but the situation was so radically changed that each country was evidently cautiously "feeling its way" before making moves of any sort.

After the President had been fully briefed on the situation, he outlined his plan. On Monday, he would make two announcements. First, Mexico was reclaiming the southwestern portion of the US, which had been taken from it over the course of the last two centuries. Moreover, it was claiming all land west of the Mississippi River, as reparation for the destruction of the Southwest, directly attributable to the US' placement of the MX system there. Second, an international conference would be held in one week, in Mexico City, to discuss a proposal by Mexico. The proposal was this: That the intact Spanish- and Portuguese-speaking countries of the world – Mexico and the countries of Central and South America – join together and form a “Federation of Roman States” – a political union created for the purpose of mutual defense, economic and social development. The invitation would also be extended to the Philippines, and what remained of Portugal and Spain, if they were able to send representatives.

“Well, what do you think, General?” the President asked. “There are two questions to address. First, can we effectively control the portions of the US that are under contention, and second, do we have the military ‘clout’ to play the dominant role in the Federation?”

“Well, Mr. President, the answer to the first question is ‘Definitely Yes.’ The answer to the second question is ‘Maybe.’”

“What do you mean, ‘Maybe’?” the President asked.

“Well,” the General responded, “the problem is Brazil. Although we have undergone tremendous development ourselves in the past few years – both industrially and militarily – Brazil has not been sleeping either. Militarily, I believe that we have the edge, particularly in the area of nuclear weapons – we have them, they don’t. The problem is that they are so massive that, while we could blow them off the face of the earth, we would have a difficult time in a conventional warfare situation.”

“General, I need a ‘yes’ or a ‘no,’” the President responded. “‘Maybe’ won’t do. Either I make the announcement or I don’t.”
“Yes,” the General said, with conviction. “Yes, we can do it.”

The President was not disappointed. The turnout was complete. All of the invited countries had sent representatives. The President delivered his proposal in the opening speech of the conference. He began with a briefing on the assessment of the damage from the war. He surveyed the state of the world as one of substantial disarray, but not without the potential for serious threats to security. While there were no longer any “superpowers,” there were still numerous countries in the world with the potential for aggression. And, in the absence of the superpowers, a secure alliance would have to stem from a union of many states, rather than from an alliance with one. Clearly, given the enormous uncertainty in world politics, the delegates were quite interested in the prospects for a security alliance.

In addition to the defense advantages of the Federation – or FER, as he referred to it – he cited the economic and social advantages that could accrue. Several of the delegates – especially from the less-developed countries – had bemoaned the fact that, with the US and the rest of the developed world gone, there were no longer any markets for their goods – mainly raw materials. Unless they could replace these markets, their economies would collapse.

The President’s delivery was a masterpiece of oratory on development. He addressed the population issue, nutrition and health, education, economic development, and social development. His message was inspired. The response was immediate and strong.

He began with a summary of the current situation, and the needs of the people of America. He talked of the poverty, unemployment, underemployment, sickness, illiteracy, and general deprivation and misery that characterized a large

segment of the population. He described the squandered resources – the denuded forests, the eroded hillsides, the polluted rivers and air, the unused human productivity. And he described how the low quality of life was totally inconsistent with the vast abundance of natural resources the Hemisphere harbored.

In this context, he set forth a set of national development goals; the creation of employment opportunities and sustained economic activity; the marketing; improved health; improved housing and public facilities; universal free education; a limitation on human population growth to promote a harmonious sharing of our environment with a rich variety of nature's other life forms; development of nonpolluting, renewable energy resources; assured public safety, social justice, and reduction in income disparities; improvement of the quality of life in rural areas to reduce the migration to urban areas; improved communications and transportation; better opportunities for recreation and culture; and a strong national defense.

Having specified the national development goals, he next specified a set of government policies and priorities that would guide the development process. He identified the private enterprise system as the foundation of the Mexican social and economic system, and specified the role of the government as one of catalyzing the private system to work for the welfare of the citizens, of protecting the citizens from undesired concentrations of power, of insuring internal and external security, of conducting regional and national planning, and of assuming risks that were too great for the private sector to assume. He discussed government policies in population, employment, income distribution, agrarian reform, social welfare, natural resource use, human settlements, and tax policy. He set an end to taxation of individuals, shifting the burden of public finance to a value-added tax on basic economic units of twenty or more persons, and to returns from government monopolies in energy, transportation, communications, and natural resources. And he set an end to the

invasion of privacy associated with the use of centralized databases and universal numerical identifiers for human beings. Given the government policies and priorities, he then sketched a development strategy by which the identified goals and objectives would be realized.

And then, the bombshell! Just as he had finished the opening address and seated himself, a message was delivered to the podium. The Secretary of the conference read the message to himself. He was visibly upset by what he read.

“Mr. President,” he began, “I have just been handed a message from the Ambassador from the Union of South Africa. The message concerns all of us. I shall read it in its entirety.”

Holding the message in front of him, he began to read. “The message is addressed to the Delegates to the Conference on the Federation of Roman States. It is from the President of South Africa. It begins:

‘Delegates: This message informs you that a state of war exists between South Africa and the countries of Central and South America. Today, while you are attending this conference, a nuclear weapon, delivered by missile, will be exploded in a small town near each of your respective capital cities. This is being done to convince you of our capability and our seriousness. From today, your governments have ten days to surrender to South Africa. If you do not comply, we shall detonate a nuclear warhead on one or more of your major cities. We shall use low-blast enhanced-radiation weapons, in order to preserve as much of the industrial capacity of the targets as possible for later acquisition.’”

The Speaker stopped speaking. Pandemonium broke out. It seemed that the shock of the message had been magnified by its stark contrast to the President’s message of peace. The delegates stood up, and began talking excitedly with each other. The President took the stand again. “Gentlemen, Gentlemen!” he called, as he pounded the gavel. Gradually, they sat back down.

“Gentlemen. The picture may be bleak. But it is not hopeless. South Africa may be strong. But we are not powerless ourselves. I have a plan, which I will discuss in two days in closed session with the president of each of your respective countries. Until then, we adjourn.” He pounded the gavel and walked quickly from the room.

“My proposal is this,” the President began. The leaders of the delegate countries had assembled in the closed session to hear his proposal. They were present to a man. The shock of South Africa’s surprise announcement had been considerable, but the shock of the sight of total destruction of one of their towns was brutal. He continued, “Several years ago, Mexico launched an ambitious program to develop a strong nuclear weapons capability. Today, we have that capability. While South Africa no doubt has the capability and the determination to destroy us if we do not capitulate, we too have the capability to destroy them. The situation is such, however, that we cannot delay. We have the capability to destroy South Africa, but only if we act quickly and decisively. Mexico cannot afford the luxury of a conventional war, either in South Africa, or in South America. Our options are limited to a nuclear first strike.”

The President sipped on the water before him, and continued. “Our proposal is not, however, without its price. In return for Mexico’s defense of your countries, we will insist on your joining the FER. Further, you will agree that Mexico will assume a position as head of the Federation. And finally, you will agree to the construction of a new Federation Capitol, to be jointly financed by the members of the Federation, and to be located in South America.”

He paused, letting his proposal sink in. Then, without further ado, he asked. “Well, gentlemen, what is your decision?”

“What if we do not agree?” asked the representative from Brazil. “In the course of your defense of yourself, it appears that you would defend all of us.”

“Mexico has the capacity to defend itself from South Africa’s threat,” he countered. “If you do not agree to our proposal, we shall make our capability clear to South Africa, and convince them of Mexico’s ability to strike back. If you do not agree – all of you – Mexico shall go it alone, and we shall so inform South Africa.”

“Dictatorship by Mexico, or dictatorship by South Africa – what’s the difference?” one of the delegates retorted.

The President kept his temper. “I’m not sure we bronze-skinned Latin Americans would find South African rule any too palatable. You know their history as well as I do. The English – stuffing pygmies halfway through the nineteenth century; the Germans – shooting Namibians for sport in the first war; and the Dutch, with their apartheid. South Africa is an amalgam of all three. We Mexicans may be aggressive, but you and we are brothers, and we want to prosper together. South Africa wants more slaves. A comparison of us to them is ludicrous.”

The President paused again. There was silence. It was clear that they would agree to his proposal. There was no rational alternative, short of capitulation to South Africa, and that alternative was clearly less palatable than acquiescence to Mexico’s demands.

He continued. “We have drafted a document of agreement, for your signatures and ratification by your governments. Both of these conditions must be satisfied by Friday, or we will take unilateral action.”

It was obvious that the President was in the driver’s seat. The discussion continued for a while on detail, but the substance of the proposal remained, and was unanimously agreed to. Two days later, the ratification was completed.

On Sunday, three missiles streaked toward South Africa – one toward Johannesburg, one toward Cape Town, and one toward Pretoria. Minutes later, the skies over each respective target were rocked by the detonation of a thermonuclear bomb. In an instant, the political and industrial heart of South Africa was stopped. The three once-bustling cities were no more.

XVII. AFTER THE BALL

Part 1

School Days

St. Louis, on the evening of the attack...

Chuck and Sally watched from the street as their house burned to the ground. The two weapons had struck St. Louis just five minutes ago, as they were watching television. Their house was located on the western outskirts of the city, several kilometers from the ground zeros. When the blast wave had reached their house, it had attenuated to the point where it was not capable of leveling it; it damaged it severely, however, and the ruptured gas line provided the fuel to quickly transform it into a raging inferno. Luckily, neither Chuck nor Sally had been injured, and they had been able to extricate themselves from the wreckage without delay.

As soon as they had gotten out of the house, they realized what had happened. They could see the two large mushroom clouds forming over their city, and they watched, spellbound, as the clouds gradually drifted away toward the east. A physics teacher at the high school, Chuck knew a little about the effects of nuclear weapons. Although the major portion of the cloud was drifting

away from them, he knew that a portion of the “cap” of the mushroom would initially spread out in all directions as the fireball cooled and spread out as it hit the cooler layers of the upper atmosphere; located under a portion of that cap, they were sure to receive some fallout.

“We’ve got to get to cover,” he told Sally. “The radioactive fallout from the cloud is very intense in the hours and days right after the explosion. The school is mainly concrete and brick, and it’ll afford a good deal of protection from the radiation. Let’s go, we’ve got to move quickly!”

Chuck and Sally walked quickly down the middle of the street toward the school. The street was littered with debris from the blast. Most of the houses were burning, and the heat was considerable. A gentle wind, blowing toward the stem of the mushroom cloud, was fanning the fires. In the noise of the burning houses, a few moans and screams could be heard.

“Oh, Chuck! We’ve got to help!” Sally insisted.

“Hell no! There are thousands of trapped people – probably more than aren’t trapped. If we tried to help, it’d take all night, and we still wouldn’t be through. By then, we – and they – would be dead from the fallout radiation. Only those who can save themselves will survive. Besides, the injured will probably die anyway, since there won’t be any medical treatment. I’d like to help, too, but if we do, we’ll all be dead. It just won’t do any good. Come on! Every minute counts! I know what I’m talking about!”

Sally looked at him. She was horrified at not responding to the cries for help. She looked at the mushroom clouds, still visible as they floated away. The fires were getting more intense. They probably would get burned or hurt themselves if they tried to help. And what Chuck said about the fallout was probably true – she remembered the many fallout shelter signs she had seen in the early 1960s when fallout was a big issue, before people had “learned to live with the bomb.” Torn between reason and

emotion, she hesitated, looking in the direction of a collapsed house.

“Come on, Sally! Let’s go!” Chuck insisted, pulling on her hand. She closed her eyes momentarily and shook her head, in an attempt to dismiss the moral conflict of “casting the mote from her own eye.”

Jogging along the street, they passed other people standing in front of their burning homes. As they passed each group, Chuck yelled to them to go to the school to get out of the fallout. Some, evidently realizing what he was talking about, joined them immediately in their jog to the school. Others, apparently not knowing what he was talking about, or in a state of shock, simply continued their vigils in front of their burning homes.

“Oh, Chuck, why don’t they come?” Sally complained as a family with two children failed to respond to Chuck’s entreaty.

“Forget them!” Chuck exclaimed. “They’ve been warned. We don’t have time. Every minute we’re out here we’re accumulating a greater dose of radiation.”

A few minutes later, they reached the school. Built of brick and concrete, it had not been severely damaged by the blast. All of the windows were gone, but no fires had started. Chuck reached through an empty window in the front door and pressed the handle to open the door.

“We’ve got to get to the center of the school in the basement. We need as much mass between us and the outside as possible,” Chuck explained to Sally and their companions. It was dark in the hallway and the group moved slowly toward the center of the building, their way lit by two cigarette lighters. As they passed the office, Chuck paused. Verifying that the door was locked, he stepped back, rushed toward the door, and burst it open with his shoulder. Inside, he rifled a few of the desks, until he found a portable radio.

“What are you doing, Chuck?” Sally asked.

“I want to see if anything is on the radio. Also, we’ll need this to hear word on postattack operations,” he explained, as he scanned the whole AM frequency band. “Nothing,” he concluded. “Let’s go downstairs.”

When they reached the room that Chuck thought afforded the best radiation protection, Chuck turned to the group and said, “We should get some mats from the gym to sleep on. Also, nobody use any of the toilets. We’ll need every drop of water to drink.”

There was an instant reaction to his suggestion from some of the women and children.

“I’m serious. The city water supply is gone. If we run out of water, we’ll have to go out into the fallout, and we’ll die. Jack,” he said, turning to one of the men, “first thing in the morning we’ve got to get all of the cafeteria supplies down here, before someone else breaks in and gets them. Also, bring all the knives down here. We’ll need to protect ourselves, if things get rough. For now, though, let’s just get the mats to sleep on.”

“You’re crazy, Chuck,” one of the women said, reacting to his “antisocial” behavior. “We’re civilized people. What are you talking about?” she scorned.

Chuck turned to one of the men, a retired Army Colonel. “Col. Saunders, tell her what it’s like when ‘civilized’ people run out of food and water.”

The Colonel looked at the woman. “He’s right, ma’am,” he acknowledged. “I’m afraid we’re on our own. The city is destroyed. The country may be destroyed, too, for all we know. There may not be any help. It could very well be a case of our survival or theirs.”

The group retrieved several wrestling mats from the gym, and in less than an hour had settled down for the night. It was, however, a sleepless one. During the night several other small groups of people joined them. The school was the only substantial building in the neighborhood, and it was natural for the homeless to migrate to it. Of the late arrivals, several were injured – fractures,

cuts, and burns. Setting broken bones and dressing cuts kept several people busy for more than an hour. One of the children – a little girl – had suffered a broken arm, and she cried the whole night through. By morning, the group was exhausted.

Chuck was tired, too, but he realized that they had work to do. First, they retrieved the foodstuffs from the cafeteria. Fortunately, the school was heavily stocked, and it appeared that food would not be a problem for some time. With regard to water, however, the picture was bleak. The commodes were filled, but the water pipes had drained. Chuck checked the fire control standpipes in the building, but to his dismay he discovered that the water they contained was not potable – it had been poisoned with a rust preventative.

Chuck asked the men of the group to work with him to set up a plan of action. First, they established a defense plan. Guards would be posted at the four access points to their shelter at all times. One of the guards would periodically check the front of the building for the arrival of whatever civil or military defense assistance might arrive. One of the principal subjects of discussion was how long they must stay inside. Unfortunately, no one—Chuck included – had any idea how intense the radiation levels might be. Chuck argued, however, that because of the rapid decay of the radioactive isotopes – a sevenfold decrease in radiation intensity over a tenfold increase in time – they should stay in as long as they possibly could. The group concurred. Another major issue was whether to accept new arrivals at the school. The group decided they should: if the arrivals were few, the impact on their supplies would not be great; if many, they would probably not be able to turn them away anyway.

By the end of the second day, the few severely injured members of their party had died. The bodies were placed in a classroom far from the shelter.

On the third day, several more people showed up. They had initially tried to stay in their own homes, but had run out of food

and water. From their condition, Chuck decided that the fallout levels were high. They were covered with beta burns from direct contact with the fallout dust. They were lethargic and nauseous; they vomited and had diarrhea; they suffered malaise and loss of appetite. After another day or so, their symptoms improved somewhat, but Chuck knew from the intensity of their initial symptoms that they were probably doomed. In a couple of weeks, their internal organs would start to hemorrhage. Their white blood cell counts would drop, rendering them vulnerable to infection and disease. Their hair would fall out. The fever would begin, followed by delirium, coma, and death.

Two days after the arrival of the newcomers, Chuck held a meeting with several of the original group, to give them his assessment of the situation. In his opinion, the fallout levels must be very high, and it was essential to remain in the shelter. Hopefully, a heavy rain would wash some of the fallout away.

“As sick as these people are, I believe that they have received a radiation dose of between two hundred and one thousand rems. If they had received over a thousand rems, they would exhibit even more severe symptoms than they have – in addition to nausea and vomiting they would be hyperexcitable and exhibit lack of muscular coordination, respiratory distress, and intermittent stupor. From a pessimistic point of view, let’s say they’ve received a thousand rems in three days. As I recall, in three days a person receives about eighty percent of his total dose. That means that an unprotected person would receive a dose of about two hundred rems from today on, if he’s outside. That’s not enough to kill you, but it’ll make you sick. I’d recommend that we stay inside for at least several more days. We have food for that long. Then, I’d recommend that we make a break for it, going farther west of the city, where there is unlikely to be much fallout. I’m assuming, of course, that they didn’t hit Kansas City. If they did, then we could be heading right into their fallout.”

“If the new arrivals are dying, just how safe are we?” one of the others asked.

“This old school is heavy construction and we’re below grade. Also, there are three concrete floors over us, separating us from the fallout on the roof. I would estimate that the attenuation factor, or ‘protection factor,’ or ‘PF,’ as it’s called, is probably close to one thousand. That means our accumulated dose to date is about two rems, assuming that we got very little dose prior to reaching the school. As dose of under one-hundred rems will not produce illness, I’d say we’re in good shape,” Chuck concluded.

“How certain are you, Chuck?” Col. Saunders asked.

Chuck thought for a moment, and responded, “Colonel, I’m pretty sure we’re safe. The PF of this building is probably as high as I think it is. Our dose is not high. What I’m not sure about is what’s out there. The new arrivals no doubt got some radiation protection from their own houses, but the PF could range from two to two hundred. If they were somewhat protected – say in a basement – and are this sick, then the dose rate outside could still be enough to fry us.”

Chuck paused. “You know,” he continued, “it’s a god-damned disgrace how our government wrote us off. They knew a nuclear war was possible, but they did nothing to prepare for it. We don’t have stocked fallout shelters. No food, no water, no lights, no medical supplies. Most of the people in the neighborhood had no idea of the urgency of getting to a fallout shelter to avoid dying from the fallout radiation – the new arrivals are dead people, in my opinion. We haven’t received one word over the radio on what the radiation levels are outside. Hell, we don’t even have a Geiger counter. It almost looks as if the government *wanted* the city folks to die, if a nuclear war happened. It makes me damned mad! We poured billions of tax dollars into defense, and yet it appears that millions of people will needlessly die from radiation injury. We could have saved Mrs. Jones, who died a few days

ago, if we'd had even sulfa drugs to stop her infection from her cuts. And now we're running out of water. If we go outside for more, we may die from radiation exposure. Without a Geiger counter, we may drink contaminated water." Chuck paused. "Well, that's all water under the bridge at this point. To answer you straight out, Colonel, I'm not very certain. I keep hoping we'll hear something on the radio, or that the army will show up with Geiger counters. For now, all we can do is stay here till the food and water run out, and then head west."

They talked for a while longer – there was little else to do during their stay in the shelter.

"You know, Chuck," one of the men said. "One thing that surprised me was the relative lack of serious injuries we've seen. Why do you think that is?" he asked.

"They're dead," Chuck responded.

"Dead?"

"Yeah, dead," Chuck repeated. "They died from blast injuries or fire. They were trapped in their homes. There was no rescue service available. If the attack had been during the day, with a lot of people outside, you would have seen a lot of 'flash' burns from the thermal pulse. With most people at home, however, that didn't happen. And for people much nearer to the center of town than we are, the overpressure from the blast wave would have ruptured their lungs and they would have died right away from air in the veins or from suffocation from fluid filling their lungs. No, what you've seen here was to be expected. The uninjured survive, the injured die. The irony, however, is that because of the government's lack of concern, even the uninjured are likely to perish, from radiation injury or starvation – of course, starving to death slowly over the course of the next year because there's no food anywhere might be worse than dying from radiation exposure right away."

On the fifth day, they ran out of water. A long discussion ensued to determine what to do. Chuck and the others worked up a plan. There were four likely sources of water nearby: commodes in homes that were damaged but not destroyed, soft drinks-/fruit-juices-/beer in the supermarket at a nearby neighborhood shopping center, standpipes in some of the buildings at the shopping center, and a creek about a half-mile from the school. The group worked out a route, by which two men with a large bucket would run in sequence to the four possible sources.

An hour after they left, the men were back with water from the creek. Chuck mentioned that the water may be contaminated with radioactive elements, but there wasn't much that could be done about it anyway. The men attempted to find some halogen tablets at the drug store in the shopping center, but found none. The women hence began the task of boiling the water over a fire they set on the cafeteria stove, using wood from student chairs and desks.

On the seventh day, the guard at the front of the school heard an airplane, and ran outside to see what it was. The plane – a relatively small one – was flying relatively low to the ground and passing quite close to the school. He could see an instrument about the size of a basketball hanging from it, suspended from the fuselage by a long cable. The plane was dropping flyers, and the wind was blowing them toward the school. The man ran toward the flyers, retrieved several of them, and hurried back to the school.

Inside, he quickly informed the others of the event, and passed around the several copies. The excitement of the group at this first contact with the “outside” was tempered by the content of the message:

“This is a message from the Government of the United States of Mexico. Your country, the former United States of America, has been destroyed in a massive nuclear attack by Russia. Virtually

all of the major cities and military installations have been destroyed. Your government no longer exists, at either the federal level or the state level. Most of your population has been killed. Radioactive fallout covers your lands; the East Coast is uninhabitable; the West Coast destroyed by nuclear weapons and earthquakes.

“Effective immediately, Mexico is reclaiming all land of the southwestern US, which territory was previously taken from Mexico by force. Since much of this land has been poisoned by radiation, however, we are hence claiming all land west of the Mississippi as reparation.

“As a humane gesture, the Government of Mexico is relocating the few city survivors to towns or farm sites in rural areas. Each relocated family will be provided with a job or with sufficient land and equipment to sustain his family in a dignified fashion.

“The Government of Mexico is currently monitoring the radiation levels, to determine routes by which your area can be approached. We currently plan to arrive in your area on the date and location specified below. Please assemble at that location at 1200 hours local time for evacuation. Until that time, please stay inside heavy buildings, to protect yourselves from the radiation. (A list of precautionary steps to reduce the risk of radiation injury is provided on the back of this sheet.)

“The Government is in the process of setting up Mexican Administrators in all cities in the occupied area. The new Administrator will distribute a document that summarizes Mexican law, civil regulations, and temporary martial-law regulations. As of this date, all former US citizens who resided west of the Mississippi are declared Mexican citizens, and are subject to Mexican law. The new border – the Mississippi River – is closed; no immigration will be permitted. This action is necessary in order to insure that there will be adequate food supplies: there will simply not be sufficient food for all of the survivors, and we tempt mass starvation if we overload the remaining food production

system. Please retain your Social Security Cards to verify your home address. Violators of civil and martial laws will be punished severely.

“It is recognized that the war will result in massive economic dislocations. The Administrators will assist in the identification of Mexican markets for your goods and services, and will relocate all individuals who have become unemployed because of the war. No Citizen will lack the opportunity to work for his sustenance. Your US currency is valueless. To initiate monetary exchange in Mexican currency, each Citizen will be provided with a modest stipend.

“Mexico welcomes you as its new Citizens, and looks forward to a future of prosperity, in which each individual, working hard and sharing equitably in the blessings of our natural resources, will realize his full potential and reap the fruit of his labor. May God favor our undertaking.”

As the members of the group read the message, a quietness settled over them. The shock of losing their country was considerable. After the initial shock of their defeat had subsided, they began to discuss how to reach the assembly point, which was several kilometers from their present location.

At one point, Col. Saunders turned to Chuck and asked, “Well, Chuck, what do you think of the situation?”

Chuck looked the Colonel in the eye, and glanced at the rest of the group of survivors. His mind was filled with a mixture of emotions: regret for the bad situation, anger at the failure of the US government to prepare its people for a nuclear attack, concern for his wife and friends, and relief at the prospect of rescue and the end of their ordeal. “I think, Colonel,” he responded, “that we should get some Spanish books from the second floor, and learn the Mexican pledge of allegiance.”

Part 2

Water, Water, Everywhere

Preface

“The High Plains Region, which encompasses large areas of Colorado, Kansas, New Mexico, Oklahoma, Texas, and Nebraska, is facing major and imminent adverse economic changes due to the depletion of its underground irrigation water supplies. These changes will affect large numbers of agricultural and nonagricultural enterprises throughout the Region, the surrounding areas, and the Nation.

“The Ogallala aquifer in the High Plains Region provides irrigation water for almost 10 million acres – 23 percent of the Nation’s total irrigated farmland. This aquifer will essentially be depleted for agricultural purposes within only 15 to 20 years. Even now, as this depletion continues, farming in the Region is reverting to low-productivity dryland techniques. This progressive shift back to dryland farming is increasingly causing serious economic consequences for the Region, the States, and the Nation itself. For example, 25 percent of the current gross product of Kansas City is derived directly from agricultural production in the High Plains Region.

“The economic problems created by the depletion of this irrigation water invite a variety, if not a combination, of solutions, some of which are water- and agriculture-related while others are not. In the past, there have been several fragmented efforts by the local governments, individual State governments, and Federal agencies to devise a strategy and program of remedial action. To present these efforts have been notably unsuccessful.”

The High Plains Project
US Department of Commerce
Economic Development Administration
March 1978

In a small town in rural Kansas...

I *have* to have more water!" Bill insisted. "It's impossible to grow anything on the allotment I've been given."

"Well, you'll just have to make do," the regional extension officer responded. "Don't spread your allotment over your full hectarage. Cut back on your planting."

"I've got a wife and kids to take care of. Surely you understand. When the FER took over, I lost a thousand hectares to the *colonos*. All I've got left is 64 hectares. I can't feed my family even *with* enough water. Without a reasonable allocation, we'll starve," Bill pleaded.

"You *norteamericanos* are all the same," the officer retorted in a deprecating fashion. "You've got as much land as anyone else here. You fat cats will just have to get used to a moderate standard of living. Besides, you brought it all on yourselves. You people virtually ruined the Ogallala aquifer, pumping it dry with over irrigation. Your government stood by watching the water table drop to disaster levels, without doing a thing. And what you didn't ruin through lack of water resource management, you poisoned with radioactivity."

"I didn't start the war," Bill snapped.

"Well, it was your government that dotted your farmlands with MX targets, drawing fire to your agricultural areas. Where did you think the fallout would go, as it leached out of the soil? To China?" the officer sneered. "Of course not! It seeped right into your underground water system. Don't complain to me about your problems. You brought it on yourselves. If you hadn't ruined

most of the High Plains and the Southwest, we wouldn't have had to take over all the land west of the Mississippi.”

“I'll say you took over. You're driving us farmers into the ground. Having no water's bad enough, but with no power to boot, it's impossible to run a farm. And that damned solar energy package! All we can do is light the lights, cook, and listen to the radio – I can't even pump my current allotment with one crummy windmill. All out electrical appliances and machinery are useless, ever since you shut down all our oil generating plants and funneled our hydro power to factories in Mexico.”

“We'll have plenty of power for rural areas as soon as we get the fusion plants operating. Till then, you *norteamericanos* will just have to learn to live within your means – something you never were too good at. Anyway, why should you have it better than the Citizens of Old Mexico? You destroyed *your* country. If it weren't for our stepping in, you'd be starving to death like the people east of the Mississippi. You damned ingrates.”

“I could make it if you hadn't stolen my land!” Bill snarled at the official.

“Watch how you talk to a First Citizen,” the official snapped. “I'll ignore that remark. This discussion is over. Your request is denied. Good day, sir!” he concluded, as he gestured toward the door.

Bill turned quickly and headed for the door. He was fuming, but there wasn't a thing he could do. As he walked through the door to the outside, he saw his eldest son waiting for him. His anger changed to the sorrow that only a father can know, when he has failed to provide for his family, or protect them from harm.

“How'd it go, Dad? Did you get the water?” his son asked, hoping for the best.

Bill dropped his head slightly, as he continued down the steps, placing his arm over his son's back. “I'm afraid not, Son. I'm sorry.”

As they walked down the street to the old pickup, they both looked straight ahead, not speaking. What was to be said? Each knew how the other felt.

Mary was waiting for them when they reached the truck. The outcome of Bill's request was obvious, from the silence and the gloom that had settled on the two men.

As they drove over the road back to the farm, hardly a word was spoken. Mary wiped her eyes with her kerchief. She thought back to the hard times her grandfather had told her about during the Great Depression – the desperation, the hopeless struggle against overwhelming odds. She knew she was experiencing what he had talked about. She closed her eyes and bowed her head slightly.

Part 3

Cruising Down the River

On the Mississippi River, just south of St. Louis...

The gunboat increased its speed slightly as they left the green zone and moved into the yellow zone. The green light on the panel had just gone out and the yellow light come on.

"Entering Yellow Zone Y317," the Commander called back. "Protective clothing required."

Frank dropped the mask from his helmet over his face, and Marc did the same.

"It's funny stuff, this radiation," Frank said to Marc, engaging in idle conversation. "You can't see it, smell it, feel it, hear it, or touch it, but it can kill you just the same. 'Skyshine,' they call it – radiation from the land that is scattered in the air, and 'shines' back down on you."

"Yeah, it's a mess," Marc responded. "You'd think it would wash away, and be gone by now."

“Well, they say the level is gradually dropping, but there was a hell of a lot of it around here to start with. As you know, they blasted the hell out of St. Louis.”

The gunboat continued on its patrol up the Mississippi. The night sky was cloudy, and it was quite dark. Frank raised the infrared binoculars to his eyes, and scanned the river ahead of them and to their port side.

“Looks like the wetbacks are staying home tonight,” he commented to Marc.

“They may as well. They don’t have a chance of not being caught, even if they make it across. Since we found the US government’s Social Security computer tapes, we have the identification number – and prewar address – of virtually every adult US citizen. And as long as Martial Law is in effect, we’ll continue to use their Social Security Numbers (SSNs) to tell the westerners from easterners.”

“It’s crazy how the US people allowed the government to number them. That’s the greatest threat to liberty they ever invented – even more than their crippling of the free enterprise system through their strangling taxes, regulations, and red tape. We wouldn’t have had a ghost of a chance of keeping them out without their SSNs. They used the SSN as a universal identifier for everything – medical records, bank records, driver’s licenses, property records – with all their records in centralized databases. I heard that land and property redistribution for the New Citizens was a snap because of the unique association between SSNs and their property holdings.’

“Yeah, they’d have been a hell of a lot better off if they’d used distributed databases like we do for our individual records. Except for wards of the state, everyone maintains control of his own records on his own recorder, and there are severe penalties for constructing centralized data banks on individuals – human beings just aren’t chattel to inventory.”

“By the way, I head that the Warlord of Appalachia has picked up on the SSN and is using it to ration food. Anna told me he’s requiring his vassals to tattoo the SSN on their right hands. Things are really bad east of the Mississippi. I can see why they try to escape.”

“Well, bad as it is, you’d think they’d give up, and just stay on their own side of the river,” Marc added. “The ‘casualty’ rate for wetbacks is very high.”

“Well, you’d probably try to make it across too, if all you had to eat was ‘hot’ food.”

“Yeah, you’re right. Can’t blame ‘em,” Marc agreed. “The food situation over there is pretty dismal. Not much to start with, and most of that’s radioactive. We’ve got our share of radioactive cropland, too, but at least we’ve got plenty of ‘cool’ land as well. I hear there’s quite a black market in food smuggled in from our side. ‘Cold’ food goes for several times what the ‘hot’ stuff sells for.”

“It makes me sick to think about having to eat contaminated food – it’s like taking poison. They say that radioactivity not only causes cancer and birth defects, but makes you susceptible to all sorts of other diseases as well, not to mention ulcers from radiation burns if...”

“There’s a boat!” Marc interrupted, nudging Frank with his elbow. He turned toward the Commander, “Commander, there’s a boat to the port side, about 300 meters upstream. I can’t tell whether it’s wetbacks or smugglers. We’ll have to get closer.”

The gunboat turned slightly toward the silent prey ahead of them on the water.

“*Quién va allá?* Who goes there?” the Commander called over the megaphone.

“I can see them!” Marc called out. “There are just two of them. They’ve seen us!” he yelled, as the boat started up its engine. “They’re making a run for it!”

“Stop or we’ll shoot!” the Commander ordered. The fugitive boat’s engine roared, as their quarry set the throttle wide open and headed for the eastern shore of the river.

“Fire a warning shot,” the Commander ordered to the gunman on the deck. He fired a burst from the machine gun. The boat continued on at full speed.

“Fire at will, Diego – they’re making a run for it,” the Commander ordered.

The gunboat was at full throttle too, but some of the smugglers had very fast, powerful boats. The Commander obviously didn’t intend for their quarry to escape. The staccato bursts of the machine gun punctuated the air with deafening shocks, and the tracers curved their way toward the target. Then, in an instant, the sky was filled with an orange bubble, as a round found its mark in the gas tank. A moment later, the sound of the explosion reached the gunboat. The gunboat dropped its speed to a slow coast, as it approached the burning slick on the river.

“I wonder what they were carrying this time?” Frank said, speaking as much to himself as to Marc. “Beef? Chickens? Corn? Milk?”

“Doesn’t much matter now,” Marc responded. “Two less *yanquis* to worry about.

The boat skirted the burning slick, and resumed its course northward through the cool night. The Commander called back, “Entering Red Zone R246. Drop the lead curtains.”

The curtains fell from the support rod, cutting off their view of the river. Frank sat down in front of his screen, and scanned the sensor over the river. “Not much chance of seeing anyone in a red zone,” he commented to himself, as he settled into a more comfortable position. “Hey, Marc,” he called. “Hand me a Coke, while you’re up, okay?”

Part 4

The Milk Man

Preface

One day the two great masters shall be friends,
Their great power shall grow,
The New Land shall be in its glorious days,
To the Bloodthirsty One, the number is repeated.

Nostradamus II:89

And he caused all, both small and great, rich and poor, freed and bond, to receive a mark in their right hand, or in their foreheads;

And that no man might buy or sell, save that he had the mark, or the name of the beast, or the number of his name.

Here is wisdom. Let him that hath understanding count the number of the beast: for it is the number of a man; and his number is six hundred threescore and six (some mss: six hundred and sixteen). (Rev. XIII:16-17)

And there followed another great angel, saying, Babylon is fallen, is fallen, and that great city, because she made all nations drink of the wine of the wrath of her fornication.

And the third angel followed them, saying with a loud voice, If any man worship the beast and his image, and receive his mark on his forehead, or in his hand,

The same shall drink of the wine of the wrath of God, which is poured out without mixture into the cup of his indignation; and he shall be tormented with fire and brimstone in the presence of the holy angels, and in the presence of the Lamb.

And the smoke of their torment ascendeth up for ever and ever: and they have no rest day or night, who worship the

beast and his image, and whosoever receiveth the mark of his name. (Rev. XIV:8-11)

John of Patmos

In a small city, just east of the Mississippi....

“*Please* sell me some ‘cold’ milk!” Wendy pleaded with the clerk. “My baby’s just four months old, and my milk’s ‘hot’. She’d die if I feed her.”

“I’m terribly sorry, ma’am, but you don’t have the credits. Your allocation of milk for the month is used up. But why don’t you use your baby’s card?” the clerk asked.

“It’s my third child,” Wendy responded, dropping her head.

The clerk’s expression revealed his understanding. “Well, you know the rules. Social Security cards for two children, and that’s it. So far as the State is concerned, your child doesn’t exist. No number, no food.” The clerk handed her back her Social Security card. As he did, he couldn’t help but feel sorry for the woman. As he handed Wendy her groceries in the sack she had bought, he whispered, “Ask for Mac down on 13th Street near Main. He has some ‘cold’ milk for sale.”

Wendy glanced at his eyes, and nodded her appreciation.

“Mac? Sure. He’s over there, in the restaurant,” the man indicated, pointing toward the dingy café across the street. Wendy crossed over and entered the restaurant. A man in a black overcoat was sitting at the end table, sipping a beer. He looked like the type. She walked over to him.

“Are you Mac?” she asked.

“Sure, what of it?” he responded, perfunctorily.

“I need some ‘cold’ milk,” she replied, slipping behind the table opposite the stranger.

“Yeah, so what? Who says I got any?” he asked, feeling her out.

“Mister, *please!* I need the milk for my baby,” she pleaded, in an urgent whisper.

The man glanced at her buxom chest, and smiled a lecherous half-smile. “You’re built pretty well, honey. Why don’t you feed the kid yourself?”

Wendy was embarrassed at his stare. She lowered her eyes. “I can’t. My milk’s laced with strontium-90 from the ‘hot’ food I’ve been eating. I don’t have enough credits for ‘cold’ food for myself and my family. Please, mister, do you have the milk?”

“Sure, honey, I’ve got it. It’s in my refrigerator in my apartment across the street,” he acknowledged, as he rose from his seat.

Wendy followed him out of the café and across the street to the apartment building. They entered the door and climbed the steps to apartment 88. He unlocked the door, and she followed him inside. It was a dingy, one-room flat, quite consistent in appearance with its occupant.

Mac walked over to the refrigerator and opened the door. He withdrew a container.

“This just came across the muddy Mississippi last night. Not many runners do milk, you know – not much profit in it. How much do you want?”

“One gallon,” she replied.

“This is a five-liter container.”

She walked over to it, scanned it with her portable Geiger-Müller counter. That’ll be fine. How much?”

[Abridgement 6. Wendy pays a high price for the ‘cold’ milk.]

She turned, opened the door, and slammed it behind her. She ran down the stairs and out the front door. It was drizzling. She ran down the sidewalk, toward the square, her hair flowing behind her, tears streaming down her face. Through her physical flight

from the apartment, she was attempting to escape from the scene emotionally as well.

Out of breath, she reached the square. She shuddered at what she had been through – at what she had done. God forgive her. But she had the milk. Her baby was safe for another week. At that was all that mattered.

Part 5

Paying in Parsnips

Preface

The populous places shall be uninhabitable,
For the countryside shall have a great division,
Power shall be given to shrewd incompetents,
Between brothers, death and dissension.

Nos. II:95

The great city shall be quite desolate,
Of the inhabitants, none shall remain,
Wall, sex, church, and virgin ravished,
By sword, fire, plague, and cannon shall people die.

Nos. III:84

Such great famine due to plague,
By a long rain the length of the Arctic Pole,
The Samarobryn a hundred places in the hemisphere,
They shall live without law, without political order.

Nos. VI:5

Michel de Notre Dame

And the voice of harpers, and musicians, and of pipers, and trumpeters, shall be heard no more at all in thee; and no craftsmen, of whatsoever craft he be, shall be found any more in thee; and the sound of a mill-stone shall be heard no more in thee.

And the light of a candle shall shine no more at all in thee; and the voice of the bridegroom and of the bride shall be heard no more at all in thee: for the merchants were the great men of the earth; for by thy sorceries were all nations deceived.

And in her was found the blood of the prophets, and of saints, and of all that were slain upon the earth. (Rev. XVIII:22-24)

John of Patmos

The Gaspé Peninsula, Canada....

The windows at the general store glowed with that soft orange-yellow inviting glow that suggested that it was warm inside. Dan hoped so. It was a cold evening, and he looked forward to warming himself beside Fred's big pot-bellied stove.

It was just after six o'clock. Dan had finished his business in town, and looked forward to having a beer with Fred and the several old-timers who were invariably at Fred's store.

"Whoa, boy," he called to the horse pulling the sleigh. The big draft horse stopped, right in front of the general store. Dan jumped down from the sleigh onto the packed snow that covered the ground.

"Now, Shep, you stay out here and take care of things, while I go inside for a beer," he said to his dog, patting him on the back. "I'll be back out before you know it." He walked to the front of the sleigh and tethered the horse to the hitching post. "You mind your manners, Aldebaran. I'll be right inside," he talked to the horse, as he patted it on its neck. The horse shuddered, and rattled his throat. Dan retrieved a sack from the back of the sleigh, and

walked across the sidewalk and up the two steps to the front door of the store.

“Well, well,” Fred laughed. “Welcome, stranger. Haven’t seen you in a while. What brings you to town?”

“Hi, Fred. How’re you doing? I just wrapped up some business in town and dropped by for a beer. Also, I need a few supplies – some black thread, salt, some paper, wicks, matches, and some tobacco, if you’ve got any.” Dan dropped the sack on the floor, slipped his coat off, walked over to the pot-bellied stove, and rubbed his hands together. The stove was a real antique. The door still had the original mica window, and Dan could barely see the flames flickering inside. Fred handed him a beer.

“Hi, Charlie, John,” he addressed the two old men playing checkers on the nail barrel in the corner. “Who’s ahead?” They returned his greeting.

He chatted with Fred for a while, telling him about the road conditions back to the farm.

“It’s a cold winter with a lot of snow. The wolves are coming nearer the house all the time,” Dan remarked. As they talked, the light bulb hanging from the ceiling grew dim, and went out. The bulb was powered by a windmill hooked up to an old automobile generator. The wind had evidently died.

“Why don’t you try to find a battery, Fred? You could get a couple of hours of light extra each night, after the wind dies down,” Dan suggested.

“Hell,” Fred replied, “even light bulbs are hard to find anymore. The next time that old windmill breaks, I’m going to put it over the well, and use it just for pumping.”

Fred struck a match, and walked over to the oil lantern hanging from the ceiling. He lit it and adjusted the wick until it burned brightly. He went back to the counter and started placing the supplies that Dan wanted on it.

“I’ll be paying in parsnips, Fred,” Dan remarked.

Fred tallied the bill in Canadian dollars, and converted it to parsnips.

“That’ll be three kilos of parsnips, Dan.” Dan reached for the sack he had brought into the store, and they settled the deal.

Dan started to take the items from the counter, and to place them into a bag. When he got to the tobacco, he paused.

“May I check this, Fred?” he asked.

“Sure,” Fred replied. He placed the Geiger-Müller counter on the counter, and started turning the hand crank on the generator. Dan held the tube up to the standard, and looked at the dial.

“Right on the money,” he noted. He then pointed the tube at the tobacco, and the reading fell to zero.

“Okay,” Dan concluded. “You never can tell about tobacco. By the way, where’d you get this, anyway?”

“Only Jack knows, and he’s not talking,” Fred replied.

“What’s the news from the Voice of Mexico?” Dan asked, changing the subject, and nodding toward the short-wave radio at the far end of the counter.

“They had a segment on the radiation levels in the eastern US – said they were dropping faster than expected. Might be pretty clean in only five hundred years,” Fred laughed. Also, they had a report on the number of people still alive in the eastern US. They estimated only a few hundred thousand people east of the Mississippi, most of them in the mountains. Said that most of the war survivors died or left for Canada, when Mexico wouldn’t let them migrate west, “ Fred added.

“From the number of Americans around here, I’d say most left for Canada,” Dan laughed. “Quebec’s been taken over by the English once more!”

“You’re right about that, Dan,” Fred agreed. “And the frogs are damned mad about it, too. Not a hell of a lot they can do about it, though, now that they’re so outnumbered. By the way, I heard that there’s a move to reconstitute a provincial government. With Montreal and Quebec City gone, however, there’s no other really

large city left. Most of the activity has been in Three Rivers,” Fred added.

Just then, the door burst open. It was Terry. He was beaming. And he was carrying a five-foot set of moose antlers.

“I got one! I got a moose!” he exclaimed. “First time in years. It’s just like old times,” he laughed. “Salmon back in the river and moose back in the woods. Dan, I’ve got a steak with your name on it,” he added.

“Congratulations, Terry, -- and thanks!” Dan responded.

They talked for a while longer, and then Dan glanced at the clock. “Hey, it’s getting late. I promised my wife I’d be back before late. She worries now that the wolves are coming out.”

He collected his goods, bade his adieux to his friends, and walked outside to his sleigh. The moon was up, and the road was brightly lit. He rode along in silence, broken only by the jingle of the bells on the horse’s harness. About halfway back, he heard the call of the wolves in the woods. Shep stood up, and growled. “That’s all right, boy,” he comforted, glancing at the rifle beside him.

As he neared the farm, he reflected on the good life here on the farm. His great grandfather had felled the virgin forest to make this farm, only to see it deserted two generations later, as the young men all left for the city jobs. All that was changed now. Canada was a rural land once more, and so far as Dan was concerned, that was fine.

He pulled up to the barn, opened the barn door, and brought the horse inside. The smell of the barn filled his nostrils. He was glad to be back home. After bedding down the horse, he headed for the house. His feet crunched on the crisp snow beneath his feet. He walked around to the back door.

As he walked along the side of the house, he smelled fresh wood on the wood stack. The kids must have split some logs, he thought to himself. He opened the door to the vestibule, stepped

inside, and removed his boots. Opening the kitchen door, he stepped into the brightness and warmth of his home.

“Hi, dear,” his wife greeted him with a kiss. “I’m so glad you’re back. Did you get the thread?”

“Sure did, and the other stuff, too.”

The children greeted him and he reciprocated. He asked the older one to put the remaining parsnips back in the potato cellar. He drew some hot water from the tank on the stove, and poured it into the washbasin. As he washed his hands, he smelled the aroma of the beef stew that his wife had evidently prepared.

After supper, the family gathered around the fireplace. His wife had fixed some hot cider, and the family was ready to relax. Finished with the dishes, she was now knitting a few rows on a new pair of gloves. He picked up his guitar, and played *The Wreck of the Old Ninety-Seven* for the children.

“Dad, tell us some more about Virginia – about the giant airplanes, that could take you halfway around the world in a day, and the color televisions,” his younger child asked.

“Okay, okay,” he laughed, “but first, talk to me in Spanish for a while.”

“Aw, Dad, nobody else is learning Spanish. And our teacher, Mrs. Jones, doesn’t even know how to speak it. What good is it, anyway?”

“Now you learn that stuff. One day, the Mexicans will arrive, and you’ve got to know how to communicate.”

The dog stirred, and moved from the braided rug to a position nearer the fire. Outside, the silence of the night was broken by the call of a wolf. The smoke rose slowly from the chimney, and drifted toward the east.

XVIII. THE THOUSAND-YEAR PLAN

And I saw an angel come down from heaven, having the key of the bottomless pit and a great chain in his hand.

And he laid hold on the dragon, the old serpent, which is the Devil, and Satan, and bound him a thousand years.

And cast him into the bottomless pit, and shut him up, and set a seal upon him, that he should deceive the nations no more, till the thousand years should be fulfilled; and after that he must be loosed a little season. (Rev. XX:1-3)

John of Patmos

The Capital, South America....

The President stepped out on the dais overlooking the construction. He turned to Juan. “When it’s finished, it will be the greatest capitol ever built – a fitting symbol of the Federation’s role in the preservation and development of civilization on this planet. This city represents the manifestation of my life’s dreams. I thank God I’ve lived to see it happen.”

The President was clearly moved. His eyes, moist, glistened as he spoke. His eyes panned the horizon. He stretched out his muscular, tanned arm, in a wide sweeping motion. “For as far as the eye can see,” he continued, “are the lands of the people of the Federation of Roman States – the progeny of Seneca and Montezuma. Out of the ashes of a destroyed world, a phoenix has arisen. Call it what you will – the second Roman Empire, a reincarnated Aztec kingdom, a reborn America. It represents the potential for a full life for our people for a thousand years to come. Our people, bound by a common tongue and a common purpose, are building a strong, dynamic nation, in which each individual has the opportunity and the freedom to realize his full potential.”

He glanced at Juan, and reflected on the past. “We paid one hell of a price, Juan – half the world died that our people might not perish, giving birth to this dream. The rest of the world has gone

to sleep for a long time. The Northern Hemisphere is a wasteland of fragmented, medieval communities. Africa is again a land of tribes, Asia once more a land of feudal warlords. Some day, when our own house is finished, when the plague has washed from the north, we will lend our hand to raise the rest of man back to its feet. But first," he was coming back to earth, "we have much work to do. Let's go!"

They walked down the hill to the car waiting below. The hot morning sun beamed down from the deep blue sky. Halfway down the hill, Juan stopped. He turned halfway around and looked up the hill, over his shoulder. A few steps further down the hill, the President realized that Juan had stopped. He turned around, and said, "What's the matter, Juan?"

"Oh, nothing. Nothing at all. I was just thinking about my wife."

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