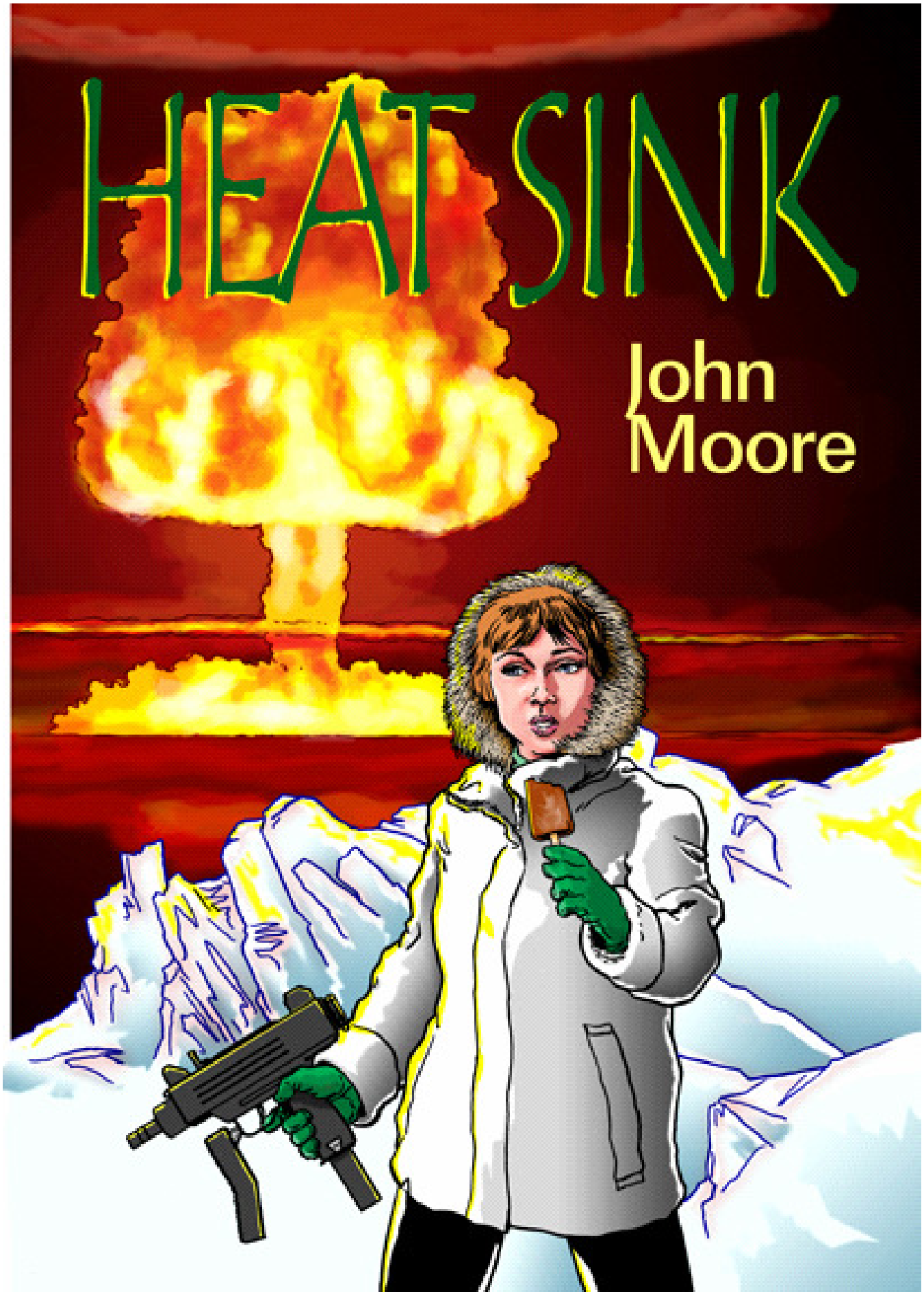
HEAT SINK

John Moore



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by

John Moore

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In the gray arctic twilight the platform gleamed as if crusted with diamonds, the ice-coated metal lit by a score of floodlights rimming the main deck and shining down the wide steel legs, then reflected skyward by the glowing blue and white of the frozen sea. Ice had been accumulating on the rig for two months, but unless it interfered with operations, no one was going to chip it away. The rusty, pitted steel of the twenty year old rig would not stand much more chipping, and the ice covered some of the holes in the metal walls.

Deteramov hunched over the railing, his back to the gale force wind, and brooded over the ice. On the platform, twenty meters above sea level, the air was clear and cold, but down on the pack the wind had whipped the loose ice from the surface into a five meter high blizzard, and the granules rattled against the metal legs of the rig. Fifty meters above, a roughneck hooked himself to the derrick with a woven plastic safety line, then began scraping ice from the crown block. Deteramov knew the man could only stay out in the freezing wind a few minutes, even protected by down-filled coveralls, before retreating into shelter.

They had waited too long, he knew. They'd only had a month to drill, and even if their timing had been perfect, it would have been a close thing. But there had been delays, and too much confidence, and time was lost, and then the drill was

deep within the anticline, with only a thin layer of shale between them and two hundred feet of oil-bearing sandstone, and they were just too close to give up then. That night the wind shifted, and the ice closed in, and hours later the Shelf 5 was frozen into the pack, one hundred kilometers north of Novaya Zemlya and far too far for any icebreaker to get through to them. Now, despite the howl of the wind and the rattle of the ice storm, Deteramov could still hear the groaning of metal as the semi-submersible drilling platform took the pressure of the constantly shifting pack.

Just three more days, he thought. One more day to complete the hole. Two days for the divers to attach the production head. It would be down on the ocean floor and safely away from the ice. Then they could abandon the platform, cut it loose to drift with the pack, and the crew would ride back to Arkhangel on the hovercraft.

And they might not even lose the platform. It was entirely possible that, drifting with the pack instead of fighting it, the ice resistant sleeves protecting its legs could get it through the winter without being crushed. Next summer they could batter their way in with an icebreaker and retrieve it.

His thoughts were interrupted by a crack and a series of booms, like so many howitzers. Below him an ice flow shattered itself against a steel pillar. The rig hardly trembled, but Deteramov was not reassured. This was first year ice, containing salt, spongy, rotten, milky white, and easy to break. Second year ice was blue-green, like turquoise. It had suffered some summer melting and froze harder. Finally, within the pack, were the floes of old ice, the salt frozen out, crystal blue and hard, heading for the rig, carried along by the ceaseless drift of the pack. Would that ice break when it struck the platform? Deteramov was not at all certain that it would, and the entire weight of the pack was behind it.

There was a brief pop as one of the floodlights burned out. He went back inside.

Inside was no less noisy and only slightly less cold. Here the

chuffing of the mud pump and the motorized grind of the rotary table competed with the roar of the wind outside. The rig had two heaters, but they did not produce enough warmth to compete with the cold air coming through the cracked walls, or to keep ice from forming on the drill floor. Deteramov had brought in three more oil burning space heaters — now the entire drill crew, in addition to being covered with grease and mud, was smudged black from smoke. None of the heat reached the derrickman, cold and miserable up above the drill floor.

Tartan, the mudlogger, waved him over. He was standing on a step overlooking the mud tanks. Tartan had measured forty thousand pounds of pressure on the formation and had added baroid to the drilling fluid. That made it dense enough to control any well, but now the driller wanted the mixture changed.

"Malov thinks the casing has collapsed."

"The hell," said Deteramov.

"Yes. We're not getting anywhere this way."

For six hours Malov had been jerking the drill string up and down, trying to break through the obstruction. It would only move six meters. Deteramov understood the driller's frustration. They all wanted to complete this and be out of here.

"Malov thinks he can twist the bit off. He thinks without the bit we'll be able to pull out the rest of the string then."

Deteramov nodded. Then they would go back with a cutting bit and try to bore through the obstruction. Then fish out the drilling bit and start drilling again. "We're at three thousand meters. This will take days."

Tartan nodded. "I will have to lighten the mixture, or we'll swab the hole. But with a lighter mixture we may be able to wash out the obstruction without coming out of the hole."

"Can you control the well?"

"Oh yes. We have not penetrated the caprock yet. The kick will not be great."

He was wrong. The Shelf 5 and its crew had been moved from its normal operation in the Caspian Sea. Neither Tartan, nor Malov, nor Deteramov had any previous experience with the high pressure formations found in the Arctic. Two thousand seven hundred sixty meters below them, the casing had shattered under the pressure and heat and corrosive power of raw crude oil. Only the hydrostatic head of a long column of dense mud was keeping that crude from flowing up the well bore.

"All right." Deteramov walked up to the mud pump and put his hand on it, reassured by its steady vibration. Several times already the mud lines had frozen, and had to be thawed by butane torches. Safe operation called for a rig to have two or more mud pumps, independently powered, and at those times the second pump had come into play. But the second pump had broken down three days ago and there were no parts to fix it. If the first pump should freeze again? Deteramov considered it and moved to the BOP stack.

Blowout Preventers were also new to Deteramov. They had never been common in the Soviet Republics, which did not have the cash to buy them or the expertise to make them. The Blowout Preventer had hydraulically driven rams that would close the space inside the casing and stop the flow of oil. Normally the hydraulic fluid was an emulsion of one part soluble oil and ten parts water, but for arctic conditions, the crew replaced the water with a 52% ethylene glycol solution. Deteramov did not know that at temperatures below -40 C, such an emulsion becomes unstable. The water will separate from the solution and freeze.

The temperature that night was -42 C.

Tartan watched the pressure gauges on the mud pump. He was waiting for the kick, the change in pressure when the lighter mud, now being pumped in the hole, reached the formation. He nodded to Malov up on the control board. Malov worked the levers and brought up the drill string. It rose eighteen feet and stopped. Deteramov watched the control

panel on the BOP accumulator.

The ice struck.

In the twilight, a moving flow of pack ice seventy feet thick and four miles long struck the Shelf 5 with a blow like freight trains colliding at speed. There was a thunder like an artillery barrage as the floe shattered against the risers, piling cakes of ice the size of houses against the platform. The wire guides anchoring one pontoon to the sea bed immediately snapped, causing the semi-submersible to heave three meters. Deteramov and Tartan, and the rest of the crew, were thrown to the deck. Malov slammed forward on the control levers. The drill string dropped six meters and broke through into a layer of sandstone so permeable that oil flowed through it like a sponge. Deteramov staggered to his feet to see a column of steaming hot drilling mud erupt from the string and spatter over the rig. Tartan's pressure gauges were pegged out at the end of their dials. The casing itself was being pushed up by the incredible downhole pressure. "Mother of God!" He ran to throw the switches on the blowout preventer. The hydraulic rams obstinately refused to budge.

The entire drill floor, and everyone on it, suddenly and instantly turned from mud brown to deep black. Deteramov looked at his arms and realized he was covered with oil, that the entire platform was being drenched with raw crude, oil so saturated with dissolved natural gas that it fizzed like Pepsi-Cola. The gas was expanding as it came up the bore, increasing the velocity of the flow even more. In seconds the platform housing filled with a mist of gas and oil vapor. The roughnecks, still stunned and not quite able to believe the danger they faced, were crawling to their feet in puddles of oil.

Tartan, slipping on the oil and ice covered deck, had made his way to the mixing tank. "We'll have to pump in mud!" he shouted to Deteramov. "Add baroid! Increase the pressure!" Deteramov nodded. But it was a spark from the mud pumps that set it all off.

It flashed back to the wellhead in an instant and the oil-

vapor explosion blew the derrick housing to pieces. Tartan, Deteramov, and the drilling crew were killed instantly. The explosion blew the derrickman off the monkey board and left him dangling like a rag doll over a pool of burning oil. In less than a minute his harness burned away, but he was dead even before he struck the platform.

The accommodation modules were designed to be explosion resistant, and although the walls buckled and the doors blew away, the ten men inside were the only ones to survive the initial blast. Only two hours before, they had collapsed in their bunks, to sleep off the numbing fatigue that comes from working in subzero weather. Now, as the aluminum ceiling began to glow with heat, they struggled into survival suits. The ice pack continued its relentless pressure.

The six with the most experience found a ladder and dropped through to a lower deck. Here, the steel plating above gave protection from the flames, if not the heat. They found a survival capsule and piled inside. The rig buckled. Sure that it was about to capsize, they pulled the release lever without even waiting to strap in. Had they still been on the Caspian Sea, the fiberglass capsule might have escaped safely. Instead, it smashed itself on a twenty meter drop to solid ice.

Needlemeyer and Podarsky came out on the second deck, ran down a metal stairs, and found themselves on a thin metal maintenance catwalk that hugged the side of the rig. In the hellish light from the burning platform, they could see a swirling motion below and guessed they were looking at mist over open water. They were wrong, but it didn't matter. The heat would have forced them to jump anyway. Within minutes their bodies had frozen solid on the ice, while an inferno raged above them.

Alantov and Duchev had arrived by helicopter only the day before. The helipad was the only place they knew to look for help and so that was where they went, even though it was on the burning upper deck. Bags of casing cement lay stacked to one side and they crept along behind those and huddled in the

lee of the potable water tank, which offered some protection from the flames. Still, it became clear to them that they could remain there only a few minutes more if help did not arrive.

Help did arrive. It came straight down from the heavens, falling through the smoke and flames, landing on the helipad with outstretched wings. In the first moment that he saw it through the orange glare, Duchev thought in his hysteria that he was seeing an angel. A good atheist, he would spend the rest of his life denying that he had ever thought that.

# # #

Stolchave piloted the fixed-wing four-seater into the teeth of a strong gale. He was proud of the Yakolev; it had a brand new motor, factory rebuilt from Nizhiny Novgorod, and an American style wheel instead of a stick — very comfortable. So what if the pilot's side door had to be tied shut with rope? It flew well and that was what counted. And it was much more economical than a helicopter, that counted too.

He saw the glow of the rig as soon as he came over the horizon and nudged the man in the seat beside him. His passenger was some sort of scientist, very much interested in the Arctic. Stolchave had picked him up in Arkhangel'sk and flown him to Mys Zhelaniya, on the northern tip of Novaya Zemlya, and from there to the platform. He was cheerful and alert on the ground, but he did not speak much when in the air. Stolchave suspected the man did not like to fly.

"A flare," he said. "They are burning off the gas. They must have had a pretty good strike." His passenger nodded.

The extent of the disaster became obvious only a few minutes later. Stolchave radioed in to Novaya Zemlya and got immediate action. "They're sending an ACV, but it will take several hours to get here." His passenger nodded again. The hovercraft could do a hundred kilometers per hour, but it had a stiff headwind to contend with. "There are ships around, but nothing that can make it through the ice. The helicopters are not supposed to fly in winds greater than sixty kilometers an hour, but of course they will send them anyway. We will be the

first ones there."

All this time they were drawing closer. Stolchave told himself that all the men on the platform were dead already — otherwise they would have radioed for help. Doing this let him remain calm and detached and concentrate on his flying. He was a careful pilot and did not want to risk his plane and passenger over useless heroics. He circled the rig, low over the ice. "I can't see the surface. We can try to land, but it could be all broken up down there, pressure ridges, polynas, who knows?" He radioed this back to Mys Zhelaniya. "They'll have to send the helicopters now."

His passenger's eyes were wide and staring and he kept clenching and unclenching his hands. Stolchave was glad the man wasn't the sort who got hysterical. Many people did when faced with disaster, even when they weren't personally at risk. This was especially true with big fires, which had a scary, animal- like presence. The scientist pointed out the window and said, "There's someone down there."

Stolchave immediately whipped the plane around in a tight bank. Two men had crawled out from behind some sandbags and huddled behind a tank. They were in yellow suits with hard-hats. The gale was blowing the fire away from them, but radiant heat would cook them soon enough. Stolchave made an instant decision. "We will land and pick them up."

"Yes. They will still have to get down to us somehow. I don't think they know we're here. They can't hear us."

"We cannot land on the ice, as I have already said." Stolchave was talking as he made his approach, eyes looking straight through the windscreen. "We will land on the helipad."

"Of course," said his passenger carefully.

"I sense a note of skepticism in your voice, Doctor." It was a measure of Stolchave's concentration that he called his passenger by his title. The pilot flew a lot of VIPs around and usually made it a point to save "Doctor" for actual medical doctors, not mere academicians. He glanced at the airspeed indicator. "We have a stalling speed of sixty-seven kilometers

per hour. We have a wind of nearly eighty-five kilometers per hour. What this means is that so long as we are headed directly into the wind, we can land and take off vertically, just like a helicopter."

What this meant to the scientist was that Stolchave had them aimed directly at a two hundred meter high fountain of roiling flame. He watched the fireball fill his vision, and the heat radiating through the windscreen hammered as his skin. And then Stolchave had them around it and flying into the wind. The scientist looked behind them and saw the helipad. It was blue, with a big yellow circle painted on it. It was on the upwind end of the platform, so the fierce gale bent the flames away from it, but the fire was also creating a thermal at its base that sucked air toward it. Stolchave knew this. "Good. We take off away from the flame. Gives us more airspeed." He was easing back on the throttle while he spoke and the Yak was flying slower and slower until it hung suspended, still maintaining airspeed but not moving relative to the ground.

And then Stolchave eased up on the throttle even more and the plane began to drift *backwards*, straight at the rig, slowly sinking towards the pad, bucking in induced turbulence.

"We won't fit! There's not enough room!"

"We will fit."

"Where is the helipad! You can't see it!" The passenger strained to look down from the side windows.

"I remember where it is," said Stolchave, and then a turbulent downdraft caused the plane to drop the last ten feet, jolting both of them to the teeth. At once Alantov and Duchev were at the door. The scientist pushed it open and they piled in behind him. He leaned forward and started to get out. Stolchave grabbed his shoulder. "What are you doing?" He yanked the man inside, and jammed the throttle forward. The Yak-12 leaped off the edge of the helipad, dropping nearly to the pack before climbing rapidly into the wind.

The Doctor twisted in his seat and looked frantically behind them. "There must be others. If we go back . . ."

"This is all we can hold and this plane would not stand that stunt a second time. The helicopters will be here soon."

"Was there anyone else?"

"I don't know," said Duchev, and Alantov said, "Maybe. On the lower deck."

Anton Borski took a long last look at the twisted frame of drilling platform, now a black skeleton wrapped in orange flame. Four months later it would finally be put out by an international control team, but Borski would remember the sight for many years. He continued to stare out the window as the plane turned away and said nothing more on the whole flight back to Mys Zhelaniya.

# # #

The whiteout, that most bizarre of polar phenomena, came on suddenly, as whiteouts do, and at just the wrong time. A heavy cloud cover over the snow diffused the sun's light. An almost equal amount of light reflected back from the ice pack. That was all it took. Shadows disappeared in the even white glare, the horizon vanished as as ice blended into sky, and in a few minutes only the darkest objects could be seen, suspended against a featureless, blank white backdrop.

Michael St. Vincent took off his ice goggles, wiped them, and put them back on again. Nothing had changed. The derrick still stood a hundred yards to his right, a narrow, triangular steel skeleton that now seemed to be hanging in space. Around it the roustabouts were moving slowly and cautiously, testing each step before putting the next foot down. They looked like they were walking on a sea of milk. One of the new hands, who had never experienced a whiteout before, simply stood still and looked around, dazed. A bulldozer roared against St. Vincent's path, then shifted to a low rumble as the driver brought it to a halt and put it in neutral. Under his parka, St. Vincent shrugged in good natured resignation. The whiteout might clear in a few minutes, or it might last for days. There was nothing to be done about it, except to move very carefully, and no advantage to becoming upset.

Still, it had come at just the wrong time.

He pulled back the hood of his parka and listened. The wind could tear over the pack with a thunderous roar on some days, but today there was only a light, fresh wind, that cut across the ice island with a high keening sound. In the distance came the sharp cracks of a shattering pressure ridge, and up close the low throaty rumble of the bulldozer. And over that came the heavy drone of a turboprop.

He lost the sound in the sudden barking of dogs. The huskies were rolling on the ice and fighting. St. Vincent shook his head. He didn't like dogs and he especially didn't like Samoyeds, which fought all the time. But dogs were ubiquitous to drill camps, and morale would have suffered severely without them.

He shrugged again and started forward, very carefully. It really was incredible, now that he came to think about it. The even white light filled in all the gaps, all the spaces between obstacles, eliminated all the shadows. It was impossible to judge perspective or distance, to make out any sort of detail in the landscape at all. He walked in the direction of the landing strip, to where he knew it must be, even though he couldn't make out any of its long smooth surface in this light. The sound of the turboprop increased. He thought it might be circling, unable to land.

"They won't be able to land in this stuff," said Talent. St. Vincent hadn't even heard him come up alongside.

"Then they'll just have to come back later."

Talent shook his head. "They don't have enough fuel to get back. They'll have to land and refuel from us.

There is something in the arctic experience that encourages terseness of dialog. In a land where men sometimes have to spend weeks together huddled in the same tent waiting for the wind to drop, idle chatter can quickly become nerve-racking.

"How long can they circle and wait?"

"Not long."

"They are on reserves?"

"Yes."

St. Vincent tensed. "Are you sure they can't land? They have instruments."

"I don't know. I've never seen anyone try to land in a white out."

"There they are," said St. Vincent. A white helicopter had dropped out of the clouds. In the white out, it seemed to have magically appeared from nowhere. Now it moved in a wide arc, growing larger as it came toward them. A roustabout, moving as fast as he dared, approached the landing strip with an armload of flares.

"I told him not to light the flares yet. I think they might only add to the disorientation."

"You're probably right." The wind was blowing gusts across the airstrip. "Let's wait until they ask for them."

The helicopter came in low and skirted around the edge of the drill camp, prop wash stirring up a swirl of ice granules. Although they were wearing goggles, the two men on the ground instinctively raised a hand to cover their eyes. The helicopter hovered for a moment, drifted back over the landing strip, and dropped lower. Two searchlights suddenly came on from the beneath the fuselage.

"Now what is that for?" said Talent. "There's plenty of light."

St. Vincent thought at first that the beams of the spotlight would come together at a certain altitude, the way British bombers judged height in World War Two. He saw instead that both searchlights were aimed at the stakes that delineated the edge of the strip. He smiled and nodded.

"Very clever. He's using the spotlights to create a shadow from that stake and he's estimating his height from the length of the shadow. That's very good."

"Damn smart pilot," Talent agreed.

It was a KA-26, with a fully glazed cockpit and a sliding door on the left, through which St. Vincent could see the pilot, relaxed in his seat. Twin propellers spun above his head, powered by twin engines, twin tail booms carried an airplane

style tail beneath the rotor. Clearly it was a craft designed for safety. St. Vincent half expected to see twin pilots.

The twin pairs of skids dropped slowly and the helicopter landed, hard but safely. It was instantly lost to sight in a spray of white crystals, but that quickly dispersed and St. Vincent saw Borski standing outside the hatch, with a canvas duffel bag in his hand. Borski, as usual, was all smiles and cheerfulness. It was an unusual trait for a Russian, St. Vincent thought, when sober they were nearly as depressed as Swedes, and when drunk they were aggressively friendly. Borski waved and took three quick steps forward, then stopped abruptly and looked around.

"Careful," called St. Vincent, although the wind had started to pick up and the warning was lost. Borski nodded at him anyway and began walking again, at a much more cautious pace. It was October and the Arctic winter had begun, the pack had already frozen up, and there was not much chance that a *polyna* would open up under his feet. It was nonetheless, a disconcerting possibility, a crack that could drop him down to the ocean surface, unseen in the featureless white plain. St. Vincent waited until Borski reached him and then the pair turned toward St. Vincent's personal trailer. Two Nodwells, tracked vehicles with heated boxed cabins, drove past them to greet the helicopter.

The trailer's thick insulation made the office much smaller on the inside than it seemed from the outside. The furnishings were simple and sparse — chairs, desk, filing cabinet, and worktable. All showed signs of wear — the trailer had been hauled from one site to another for a number of years. Neither man spoke until they were seated, each with both hands wrapped around a mug of dark sweet tea. Borski took a small sip, then a large one, and then said brightly, "So! How goes life in the great white frozen north?"

"Cold," said St. Vincent. "Cold, cold, cold. We are getting back up to schedule, though. It is easier to get air support now that the other companies have shut down operations for the

winter. Also there is less chance of them snooping around. How about you take over here for a while? I'll go to St. Petersberg in your place and drink vodka all day."

"You would not like our domestic vodka, my friend, and the good vodka is all exported for hard currency. Nor, I suspect, will you find the climate in St. Petersberg very salutary at this time of year."

"No. Not back in Quebec, either."

"But all that to change, eh?"

"Perhaps in our lifetime." St. Vincent leaned back in his chair and looked out the window, in the direction of the rig. Despite seven thicknesses of double glazed glass, it was still rimed with frost on the inside, and he couldn't see a thing. He looked back to the Russian. "Did the shipment get through all right?"

"It came through splendidly and it is safely under preparation in the factory. I think it is safe to say that its arrival did not garner any official attention."

"I'm glad to hear it. And the money?"

"The installment was very well received also. Part of it will go towards the tooling up for your project. That part is already underway. Our friends . . ."

"No names, of course."

"Of course. We are keeping this compartmentalized, like in the spy novels. My friends have never heard your name either. But they are very happy to get your money. They are not greedy, I hasten to assure you. They know that both of our countries will benefit from the project over the long term. But they cannot forget our immediate need for investment capital."

"My backers quite understand. We have to survive in the present to succeed in the future. I'm sorry, that rather sounds like something one finds in a fortune cookie, doesn't it?"

"I have heard worse platitudes." It was seven years since the Shelf 5 accident and Borski had not aged well. The lines on his face had deepened, he had become stouter, and his dark hair was now shot through with silver. A heavy stubble showed

on his chin. He had lately taken to shaving every other day — there was a shortage of razor blades in the state stores, and he had not had time to track down a private supplier. "How are you doing here?" He looked out the same window St. Vincent did, also to no avail.

"Quite well, considering. We are still behind schedule, but that is merely because we are working the bugs out of so many new procedures. The heavy storm season has not started yet, but of course, productivity drops off when it becomes really cold. I can't fault the men for this. I find the same thing happening to myself after a shift in the cold. My mind just goes numb and my hands won't do what my brain tells them to do."

"You are quite right. I have had the same experience working in the Arctic myself."

"My point is, though, that there is nothing fundamentally wrong with our timetable. We are getting caught up already."

"Very good. Please excuse me while I check with my pilot. We must leave as soon as we are unloaded."

"So soon?" St. Vincent was surprised. "We have dinner waiting for you. Isn't your pilot tired? By the way, that was an excellent bit of landing."

"Thank you. I will tell him so. Stolchave is quite good at this. He helped clear Siberian river ice in the spring by landing demolition teams on the floes. I don't enjoy excitement quite as much as he does, I'm afraid. Ah, wait!" Borksi opened his duffel bag and rummaged around inside. "Here we are. I have a gift for you." He pulled out two tins.

"Caviar! Why, I thank you."

"Enjoy it, please. Once again we are restricting exports to bring the price back up, so there is a glut on the domestic private market. Of course, in the state stores it is still impossible to get." He zipped up his parka and stepped outside the door. St. Vincent followed him. The roustabouts were still unloading crates from the helicopter.

"We cannot stay, I regret. The Americans have redeployed one of their satellites and it will be coming over in a few hours.

I will transmit to you the new schedule. You should not let it affect your operations, but it would not be good to have them photograph us."

"Ah yes." St. Vincent looked at the sky, as though he expected to see the satellite now. "The Americans." He did not ask how Borski knew the orbits of surveillance satellites. The mafias ran Russia like a shadow government, extending even into military intelligence.

Borski laughed and slapped him on the back. "Do not look so dolorous, my friend. Just a short time left and you are away from here and it is too late for the Americans or anyone else to stop it. Of course," he added, "it is better even for them, in the long run."

"Better for everyone," said St. Vincent. "In the long run."

# # #

Lottie Deno was sitting on the passenger side of an aging Pontiac Fiero. The Fiero was not a large car by any means, and she sat with her knees stiff and a truly enormous handbag on her lap, thoughtfully drumming her fingers on the vinyl armrest, with a sound not unlike the drumming of the raindrops on the Fiero's roof. Idly she punched the buttons on the radio, but no sound came from it, not even static, the car having had its radio antenna ripped off some years before, when Danello had left it parked by an all night liquor store. Eventually she said, "Joe?"

"What?" said Danello. He was squinting through the windshield, trying to make sense of the street signs through the driving rain. "Jesus, will you look at this stuff come down?"

"We've been friends a long time, right?"

"Not really all that long," said Danello. "What, four years?" He tried to wipe the condensation off the side window with the cuff of his shirt.

"Okay, well that's long enough to build the kind of trust where we can talk frankly about . . ."

"Actually, we're more like co-workers than friends. Are you sure we're on the right street?"

"Shut up about the damn street. I have an important question to ask you. I need a guy's perspective on this."

"What?" Danello looked at her with surprise. "Okay, shoot."

"Okay." Lottie took a deep breath. "As a purely hypothetical question, do you think it's okay if a woman sleeps with a guy on the first date?"

"You're kidding. Who is he?"

"No one! I said it was a hypothetical question!"

"Oh yeah. Right." Danello turned his attention back to the rain swept street. "Jeez, I didn't think anyone worried about stuff like that anymore. Yeah, it's okay."

"No, seriously."

"Yes."

"No, come on. Really."

"I really think that if she really likes the guy, it's okay to sleep with him on the first date."

"No it isn't! He won't respect her!"

"I can't see a damn thing in this stuff," said Danello. "We're going to be late. Okay, if you're right, then the world ought to be full of thirty year old single women who sleep around. Instead, all the uptight women are still single and all the easy babes have married doctors."

Lottie scowled at him. "They probably got married because they got pregnant. Take a right at this light here. Don't you ever change your wiper blades?"

"Damn it!" Danello suddenly pulled the car over and brought it to a halt.

"What?"

"The 'check engine' light came on. Now we're really going to be late."

"It's probably nothing. Keep going, we're almost there. Look, Loisdale Court."

"I'm not going to keep going. We don't know what it is. I might not have any oil. The engine could seize up."

"Then your oil pressure light would also come on," Lottie pointed out. "I need a hair pin."

"A what?"

"Never mind. I've got a paper clip." Lottie pried up the cover of the center console and jammed the two ends of the paper clip into the ALCOR block. The check engine light flashed three times, then five more times.

"Code 35. Rich fuel mixture. Nothing to worry about. It will just run a little rough. You can probably drive without any problems."

"Probably! No thanks. I'm not going to get stuck out here with a burned up engine. We'll call a tow truck."

"Oh come on," Lottie muttered. She opened her door and got out, and immediately got soaked. She glared back at Danello. "Pop the hood."

He popped the trunk instead, where the Fiero had its engine. Water ran down her face and into her eyes. She squinted and pulled the connector off the manifold temperature sensor, jammed in the paper clip, and grounded it to the engine block. "Does the temperature gauge pin out?"

"No."

"Fine." She got back inside, shoving around the enormous handbag for room. The rain suddenly slacked off. She looked at Danello as though he planned this. "Why the hell did you get a sports car anyway?"

"I was having a mid-life crisis. What did the temperature gauge do?"

"Nothing. I thought it wasn't reading high enough, so I checked it. Your temperature sensor is bad, so the electronic fuel injection has the mixture too rich. It's nothing to worry about. Let's get going."

Danello looked at her doubtfully. "Come on, Joe. Really." He started the car. With the lighter rain, he was able to drive more quickly. Eventually he brought them to a four story brick building with vertical slits for windows. It was plain, bland, inconspicuous, and uninviting, and that's exactly why it was picked. For over a decade, both the CIA and the FBI had used the Spring Mall building for meetings.

Macpherson met them in the lobby. His pipe had gone out, so apparently he had been waiting for a while. "You're late. We've been waiting on you." He looked Lottie over. "I suppose it would have been too much to hope for that you could have adopted a more businesslike appearance."

Danello said, "The rain slowed us down. The car stopped. Lottie fixed it."

"My clothes make a personal statement about my identity," said Lottie. She was wearing baggy jeans and an oversized sweatshirt. Danello was wearing a suit and tie. They followed Macpherson down the hall.

"I'm afraid to ask what the statement is."

"The statement is, 'I'm the only person available who understands your data, so don't fuck with me.'" Macpherson started to say something, apparently thought better of it, and stuck his pipe back in his mouth.

They turned into a conference room, where a half dozen men were already seated. Lottie plunked herself down in a chair without handshakes or introductions and immediately looked to see if there were donuts available. There were not. She frowned.

Macpherson made the introductions. She already knew John Bainbridge. Macpherson worked with him a lot. He was in the Commerce Department's Office of Intelligence Liaison. Andrew Carlyle was a Special Assistant to the Director of Intelligence at Langley. John Godfrey was with the State Department Bureau of Intelligence and Research. There was a guy named Wall, with thick glasses, from the National Security Agency; she had met him several times before. Craig Smith, with even thicker glasses, was from the Department of Energy Office of Intelligence; she'd never met him. Lottie smiled and nodded at everyone, then ignored them while she reached into her handbag and pulled out a package of Twinkies. She tore the wrapper open.

Carlyle had two hardback books on the table in front of him. One was titled "Advanced Data Analysis," by Lottie Deno, and

the other was called "Tips and Tricks for the Data Analyst," by Lottie Deno. The back cover of each showed a black and white photograph of a rather attractive woman's face. He looked from the photographs to Lottie with a faintly quizzical expression. Lottie waved a hand dismissively.

"It was one of those Glamour Shots. I had a coupon. I actually do look like that, sometimes."

"I see," said Carlyle.

Macpherson said, "I think Ms. Deno might as well give her report now."

The group waited while Lottie swallowed the bite of Twinkie she had in her mouth. She said, "Yes."

They waited some more.

"Yes," she said. "That's my report. Yes."

"Yes?" said Carlyle.

"Yes," said Lottie. "You wanted to know if Canada was losing nuclear material from its stockpiles and the answer is yes. It is."

Macpherson said, "Perhaps you could elaborate on that, Lottie. Some of us are not fully introduced to this investigation." He spoke with exaggerated patience, carefully nurtured over several years of supervising Lottie. Danello hid a smile.

"Okay," said Lottie. "About four months ago some bright boy at the Directorate of Intelligence got a hint that Canada had a large amount of MUF. And he . . ."

"MUF?" said Bainbridge.

"Material Unaccounted For," said Smith from the Department of Energy. "Uranium and plutonium that's gone missing."

"Right," said Lottie. "And Canadian MUF is particularly bothersome, because the last time Canada was missing a lot of stuff, it turned out they had sold it to India, and India built bombs out of it."

There were nods all around the table.

"But, the CIA has a problem. It's not allowed to spy on

Canada."

"And we don't," said Carlyle.

Lottie looked at him skeptically. "Yeah, right. So they gave it to us."

"Um," said Smith. "I don't see the connection."

"The Commerce Department has an intelligence wing," said Bainbridge. He waved his hand in a small circle, indicating Macpherson, Danello, and himself. "We specifically do economic investigations and we are allowed access to CIA and DIA reports. However we are not considered part of the intelligence community, so we don't fall under Section 116."

Bainbridge was being modest. As a rule of thumb, the size of any government department's budget is a rough indicator of its influence with the Executive branch. The CIA is highly visible, but Air Force Intelligence has three times the CIA's published budget and personnel, and far more influence. Bainbridge's Office of Economic Intelligence was an exception to the rule. It had a miniscule budget, but a lot of clout with the President.

Bainbridge and Macpherson had come over together from the NSA. It had been a timely move. With the entry of China and the former Soviet republics into the world market, economic intelligence had become a hot field. The United States had got in late. The CIA had an Office of Economic Research, but it mostly focused on foreign production statistics and commercial arrangements, not specifically stealing industrial trade secrets. By contrast, JETRO, Japan's huge trade cartel, already ran one of the largest intelligence agencies in the world. France and Germany had been conducting industrial espionage for decades. Macpherson had quickly put together a capable team, and their reports were eagerly read. White House insiders had quickly learned that the high tech information they stole could be given to the big industrial PACs — for the unspoken promise that campaign contributions would flow in return.

Lottie took over again. "So we looked into it, to return a

favor, and because we're interested in world-wide energy use anyway. And that's what I've been doing. I've been taking the electronic data intercepts from the NSA, audit data from the International Atomic Energy Agency, and from the Nuclear Audit and Testing Company, mining production statistics for uranite, carnotite, davidite, and monazite — well — here's a summary." Once again she hauled her handbag onto the table, and the others watched her pull out a small stuffed Garfield doll, a paperback edition of 'Ten Days to a Trimmer Tummy,' a Snickers bar, a book of Garfield cartoons, and finally a thick sheaf of computer printout, bound fore and aft with rubber bands.

"Plus invoices, shipping manifests, bills of lading, purchase orders, bank transactions, wire transfers, telex traffic, and telephone records of companies known to handle nuclear material, or to sell, rent, or lease equipment for the handling, packaging, production, processing, or transportation of nuclear material, plus records of companies known to provide security personnel for the transportation and storage of same."

She paused to catch her breath.

"There's more but you get the idea. Compiled all this stuff, shoved it into a computer, and started searching for patterns. And they are indeed there. I've been seeing a regular, unexplained, depletion of Canada's store of uranium oxide."

There were some moments of silence while the rest of the group caught up with this flow of words. Finally Carlyle said, "Weapons grade?"

"No. Uranium oxide, not uranium metal. But you could build a bomb from it."

Smith said, "Any nuclear facility is going to have a few pounds of MUF each year. A small accretion on the inside of piping, for example, can add up to . . ."

"They're missing over six hundred kilograms."

"Oh."

Godfrey from the State Department said, "Do you know where it is missing from?"

"Not specifically, no. I can say it has disappeared from normal production channels."

"Do you know where it went?"

"No."

"Can you find out?"

"I can."

"Well," said Carlyle. "I think we have enough here to merit a finding."

Godfrey leaned back in his chair and stretched out his arms, placing both hands flat on the table. It was a gesture that commanded attention and all heads turned to him. He said, "Canada is a very good friend of the United States. Canada votes with us on nearly every UN resolution. Canada sides with us in nearly every international dispute. Canada has never shirked from committing arms and men to every military excursion that we or the UN has asked them to. And Canada is a major — *the major* — export market for the United States. In short, Canada is not a country that we want to piss off."

"Canada," said Smith, "will sell nuclear material to any third world country that can pay for it."

"We don't know if that is the case here. They may simply be diverting material to some special project of their own."

"I think we ought to find out."

"I agree," said Carlyle. "What if it was stolen from them? And they don't want to admit it?"

"We don't even know if they know that it is missing," said Lottie. "In which case, they might be pleased to have it brought to their attention."

"They will not be pleased to know that we are spying on them," said Godfrey. "You know the President feels very strongly about keeping the CIA within the limits of its charter. We have an agreement not to spy on Canada, Great Britain, or Australia. And Canada shares intelligence with MI5, with whom we also share intelligence."

Macpherson was lighting his pipe. "But the Commerce Department doesn't share intelligence and neither does the

State Department. And even if Canada is diverting the material for a peacetime use, that still falls under the aegis of economic intelligence."

"We can continue to support Ms. Deno's investigation without becoming directly involved ourselves," said Carlyle. "I think we can avoid a specific violation of section 116."

It was clear to Lottie that they had already agreed to continue the investigation, and the purpose of the meeting was to manufacture a consensus, a common enough ritual in government agencies. She was not displeased.

Godfrey took his hands off the table and held them up. "All right. Very well. However, I suggest that further reports on the matter be made directly to this group and not published as a finding until we've had a chance to discuss it."

There were nods all around the table and that was that. Lottie carried her report back out to the car and Danello unlocked the door. She tossed it on the floor and sat down with her feet on it. "I'm glad they didn't actually look at this. I didn't really want to print all that stuff out, so most of the middle is just blank paper."

"I never print anything out. The security procedures are such a hassle that it's not worth the trouble. Anyway, our jobs are safe for another month at least. I thought it went pretty well."

"They didn't have donuts. I hate people who call morning meetings and don't have donuts. I didn't eat breakfast because I thought I'd be eating donuts and I didn't want to double up on the calories."

"I admire your ability to cut right to the crucial heart of any matter. Do you want to stop for lunch?"

"No, I'm going to do aerobics during lunch. Just let me off at the gym."

"Right. Are you still coming over for dinner?"

"Ahh," said Lottie, groping for the right words, "Actually, something came up."

"Vivian said she won't try to set you up with one of our

friends again."

"Oh. In that case, okay. No, wait. I can't anyway. I'm starting another diet."

"Start it tomorrow. Vivian made *canoles*."

"Then I really can't come to dinner."

"That's too bad, because she's really got them perfected now. She does them so the tartness of the lemon peel just exactly counterpoints the sweetness of the dark chocolate."

"Okay! Don't go on about them! Tell her I'll be there. I'll even wear make-up."

"Okay." It was still raining and Danello was still driving carefully, occasionally frowning at the check engine light, which was still on. Eventually he said, "So who is this guy?"

"What guy?"

"This guy you wanted to sleep with but didn't."

"His name is Lawrence Gabriel. He's the editor of Sensitive Woman's Poetry Magazine."

She could almost see Danello's mind boggling. "Sensitive Woman's Poetry Magazine?"

Lottie set her chin. "Right."

Danello drove in stunned silence all the way back to the Commerce building.

# # #

What impressed Takanasha most was the quietness of the thing. It was ironic. Military submarine designers take great pains to reduce noise wherever possible, for noise can lead to detection by passive sonar, and water is a great conductor of sound. Floors and doors are padded, the engine rooms are insulated, and moving parts — particularly the cooling pumps for the reactor — are carefully designed and machined to minimize vibration, banging, creaking, and rattling. In spite of which, there is only so much that design engineers can do to tame a nuclear powered steam turbine, or its diesel powered piston auxiliary, and a military submarine's crew learns to live with a constant, low level thrum and vibration.

Yet the Aldershot, whose crew cared not one whit for

stealth, was the quietest submarine in the world. A hundred thousand tons of crude oil surrounded her engine compartment. All sound was damped and absorbed by the viscous liquid. Takanasha rested his fingers on the heavy railing that ran around the inside of the bridge. He couldn't feel the slightest trace of vibration.

The P&O tanker was heading east out of Bull Arm, Newfoundland when the Westland-Aerospatiale Puma finished unloading and took off from its deck, followed shortly after by a Sikorsky S-58. Still piston powered, it was the old helicopter that had brought Takanasha from airport, an uncomfortable ride wedged between crates of stainless steel and brass valves. The Aldershot depended heavily on helicopters for resupply. It had too much draft to enter any but the deepest of deepwater harbors. Even though Canada's rugged coast provided a supply of deepwater ports, the environmental hazards of bringing a tanker close to shore still required them to load and unload at offshore terminals.

"Right, well, she's off then," said second officer Shelly. He was young, bright, cheerful, and thin, with lank blond hair that fell over his eyes.

"Took you long enough to get that out," said the Captain.

"They're Canadian. They've got funny accents."

"Not half so funny as your mumbling, Second Officer Shelly. Speak up, will you? And turn the brightness down on the display, it's like looking into a bloody spotlight."

Shelly was not disturbed in the least. Captain Edward Thompsen was legendary throughout the Peninsular and Occidental Shipping line for his irritability over minor things. He liked the brightness on the computer displays turned just so, chairs on the bridge pulled just so many inches from the workstation, his binoculars put just the right way in their racks, and the chart table completely free of any loose pencils or coffee cups, or even charts, except when a course was actually being plotted. In spite of this, Shelly enjoyed working under him.

"With Thompsen," he explained once, "you always know exactly where you stand, and when he leaves the bridge at the end of his watch, you know he won't unexpectedly pop back in to check on you."

Without comment, the Second Officer calmly adjusted the brightness of the navigation display down a hair.

Lian Takanasha stood behind the two of them, not saying a word. Once again he caressed the teak railing, the only substantial piece of wood on the entire submarine. It was an anachronism, that long varnished curve among all the brushed aluminum panels and Lexan screens, and yet Takanasha understood now why it was there. It was comforting to feel a warm, smooth, solid piece of hardwood beneath his fingers, and while it did not fit in with the high tech look of the rest of the bridge, it did give the place an indefinable air of elegance that one would just not find on a military boat.

He glanced up at the ship's clock, then at his own Seiko, which read exactly the same time. His culture in general, and his own family in particular, had a great respect for tradition, and Takanasha was waiting for a tradition that he had heard about but not yet seen.

Captain Thompsen inspected the clock, saw that it read 12:00 ship's time, and picked up the microphone to the PA system. Without pause or preamble he said, "Attention please. It is now noon, and Mecca is two points off the starboard bow."

Takanasha had to smile. There were not, in fact, any Moslems on board at this particular time, but this simple ceremony dated back to the days of the old P&O passenger liners, carrying pilgrims via the Suez canal, and Captain Basil Thompsen was not about to let it lapse. Tradition. Takanasha liked that.

"Sixty one degrees, Mr. Shelly," and the Aldershot began to swing north as Shelly corrected the course. Takanasha watched the gauges swing. Another anachronism in the computerized bridge, but the British liked analog gauges in their ships.

North. North would take them through the Nares strait,

under the ice of Baffin Bay. They would skirt the continental slope of the Queen Elizabeth Islands, cross the Beaufort Sea, and turn south through the Bering strait and so to Yokohama, where the Aldershot would unload its cargo of crude. It was not a long trip, by tanker standards, but much of it would take place beneath the ice pack, where the Aldershot was meant to be.

Thompsen took his binoculars out of the rack. "I'm going topside, Mr. Takanasha. Would you care to join me?"

"Very much so, Captain Thompsen," Takanasha said formally. He overcame the reflex to bow, and simply nodded his head, then followed Thompsen up the ladder of the conning tower. Although the submarine's sail was rather large, it was mostly free flooding, and the actual conning tower occupied only a narrow column inside it. Takanasha pulled himself up the ladder. Topside, the air was cold and wet, and he stood beside Thompsen in the cramped deck atop the sail. The radar mast had been raised and in front were the gently swelling bumps of the anti-collision sonar, while the longer wavelength Doppler sonar protruded behind him and below.

Thompsen was looking around with his binoculars, scanning the gray horizon. There was a three to four foot chop, a beam sea, and he noted the steadiness of the ship with satisfaction. "An excellent design, Mr. Takanasha. Your employers should be proud."

"Thank you." Takanasha knew what he meant. Conventional submarines tended to be cigar shaped, and on the surface could roll uncomfortably in the slightest swell. But the Aldershot carried oil, less dense than the water it submerged in, and the added bouyancy allowed for some interesting design advantages. Ishikawajima-Harima shipyards had opted for a unity block vehicle — a ship that looked like a flattened rectangular prism, the most efficient shape for a tanker. The edges had been rounded off for streamlining, but the tanker still enjoyed a great deal more stability on the surface than her cigar shaped cousins.

He spent a moment just taking in the vast expanse of deck stretched out before him. The Aldershot was huge. Longer and wider than a Nimitz class aircraft carrier. An entire Ohio class submarine could fit inside just one of her oil tanks. The large, flat deck was sectioned off and provided with lights and markings for three helipads, very important for a ship that would rarely, if ever, actually put into port.

Takanasha looked to the north, hoping for his first glimpse of the ice pack, but saw only the horizon. "How long until we dive, Captain?"

"More than a few hours, Mr. Takanasha. We won't run into ice for some time yet, and I want to give the turbines a good long test while we are still on the surface."

Takanasha nodded gravely. The Aldershot had twin screws and two 25,000 horsepower steam turbines to propel them. The steam was generated by burning methane and liquid oxygen, stored in an insulated tank running down the center of the ship. The submarine had to maintain a speed of at least four knots to remain steerable. If one turbine failed, a single turbine was capable of maintaining the fully loaded vessel at five knots. But as important as the power was the exhaust they produced. The carbon dioxide from the boilers was cooled through a heat exchanger and pumped to the tanks to keep the gas concentration below its explosive limit.

"Have you been down in a submarine before, Mr. Takanasha?"

"No, Captain. Not at sea, anyway. I have, of course, spent much time reviewing the drawings of this vessel while it was still in the Ishikawajima-Harima shipyards."

"Not the same at all. Damn good idea of your company to send its engineers out on a training voyage, so to speak. Get them out into a real ship, they'll be less likely to implement some damn fool design idea that doesn't work. Mind you, though, I don't exactly relish the idea of my ship being used as a hotel."

"I will try to stay out of the way and not take up your time."

"Good, good. You anticipated me. Don't mean to be rude about it, but this will be a busy trip. Not like one of our VLCCs, cruise along at four knots, four months to go around the Horn, plenty of time to kill along the way. No, we generally take less than three weeks for a run to Tokyo or Bantry Bay. That's round trip, including loading and unloading. So you see that our time is at a premium."

"I understand, Captain. That is why we are building these."

Compared to a surface tanker, say, to one of the Very Large Crude Carriers carrying half a million tons or more, the Aldershot did not have a lot of cargo capacity. But a VLCC could not go where the Aldershot could, to the ice-bound regions of the Karev and Laptov seas, north of Siberia, or the Arctic Islands of Canada, still largely unexplored as far as oil went. From there, the shortest route to the industrial centers of Europe or Japan was under the ice cap. At a savings of ninety million dollars a trip, the extra cost of a submarine tanker was quickly recovered.

"We are under contract to build six more of these," said Takanasha. "The northern European market is very promising."

"I'm not bloody surprised. Russians are starved for cash. Got all that oil up there and they can't get it to market. Can't hardly get a tanker in, got to be accompanied by an icebreaker. Can't lay an undersea pipeline, too many deep trenches. Have to have a submarine pipeline laying ship anyway. Even in the summer, too much bloody ice about."

Takanasha nodded. "When do we dive, Captain Thompsen?"

Thompsen turned around and faced him severely. "Mr. Takanasha, that's the second time in a very few minutes you have asked that question. Am I to understand that you are nervous about diving?"

"No, Captain," said Takanasha, although he knew that the most dangerous operations a submarine could perform were diving and surfacing, when the center of gravity and the center of buoyancy passed each other. It was at this point that a poorly designed submarine was most likely to roll over. "I have

every degree of confidence in you and your crew."

"I'm glad to hear it, Mr. Takanasha." Thompsen's mouth quirked up at the corners as he fought down a smile. "I'll tell you when we are ready to dive."

# # #

Professor Trevor Strather was still three years from retirement, but he looked as ancient as an Egyptian mummy. Too many years out in the sun and the wind, taking temperatures, pressures, and humidities, too many months setting up and manning weather observation stations in remote inhospitable areas, from the Amazon delta to the Arctic shield, too many decades of exposure to the very weather he was studied, had given his skin the appearance of badly tanned leather. Fine wrinkles covered every inch of his cheeks and forehead, interspersed with deep lines, and his hair was gray, unkempt, and coarse. He looked like a man who could do yogurt commercials.

However his eyes were bright and alert, and his voice, while taking on a bit of raspiness, was still strong. He finished viewing the videotape in his office and turned up the lights. The lights revealed that the tiny office was filled with photographs. Every square inch of wall was covered with them, several layers thick, and great stacks of 8X10 glossies lay on the desk and chairs. The photographs all seemed to be the same, either great whorls of cloud patterns, or murky drifts of ocean currents. False color imaging in deep reds and yellows gave them a rather abstract, impressionistic appeal.

Brian Painchaud, one of his graduate students, opened the blinds. Outside the grass covered courtyard was brown and windswept, the sky above the University du Quebec au Montreal was gray, cold, and overcast. Across the courtyard he could see the Rue St. Denis, where the evening crowd was just starting to filter into the cafes and bistros that filled the Latin Quarter of Montreal. He turned back to the office.

"Brian," Strather said. "I have only one comment to make. Graphics."

"Graphics?"

"It needs more graphics, my boy. Now mind, I have no complaints about the research. The research is excellent, you've pulled in the data quite well. But the presentation needs punching up."

"I see."

"Don't look so skeptical, my boy. This isn't going to be reviewed by your doctoral defense committee. We'll be showing this to a lot of politicians. And bureaucrats. And probably some journalists too, I shouldn't wonder. In other words, morons."

"You want me to dumb it down?"

"Ah, a cynic. A man after my own heart. But no, the word is 'popularize.' Now we don't do pop science here, God knows I hope we don't, but we do have to popularize our work. That is how we get our funding."

Strather played with a stack of the glossies on his desk. This pile was different from the others. Each photo showed what seemed to be a length of dirty white cylinder. A ruled line across the bottom of the photo indicated that each cylinder was about two meters long. Tiny striations showed across their diameters. Strather pushed the pile across the desk to Painchaud.

He continued, "Money is what makes the research world go round, Brian. Gone are the days when humble, obscure, ivory tower academics like myself could publish our findings in a meteorological journal and expect the recognition from our peers to keep the funds trickling in. No, now we have to get out there among the MPs and the trustees and promote ourselves like Carl Sagan. Otherwise the money gets wasted on frivolities like space stations, and microchips, and those subatomic particles with the amusing names."

Painchaud had two thoughts. The first was that Strather, who spent most of his career in the field, was about as far from being an ivory tower academic as anyone could expect. The second was that he was shortly going to get much more attention paid to his research than he ever dreamed of. He kept

these thoughts to himself, however, and merely said, "Well, I suppose I could add some more charts."

"That's the ticket. Charts, graphs, maps, lots of animation of clouds and thunderstorms, storm tossed oceans. And plenty of color. We've been telling them how much we need these computers with high end graphics capability, now let's show them what we're doing with it."

"But they know what we're doing with it. They've seen the program run, and they've seen the results."

Strather leaned back in his chair and put his arms behind his head. He looked at the ceiling, as he always did when he was about to say something he considered profound. "Brian, my boy, science is a process of discovery. With the emphasis on *process*. It is not enough merely to show the *results* of your research, not if you want the public to support you. You must lead them, my boy, step by step along the path that led you to your results, so they can experience for themselves the *thrill of intellectual discovery*."

"Uh huh."

"And the most important thing is to leave out the math. Math puts them right to sleep."

"Right," said Painchaud and decided to change the subject before Strather could think of more work for him to do. "Will you be gone all semester?"

"No such luck, my boy. I will be back inside the month, perhaps five weeks if the drilling goes slowly. No more than that. Still, plenty of time for you to come up with a first rate presentation, eh?"

"Uh huh. Do you need someone to drive you to Mirabel tomorrow?"

"No, I'll be riding to the airport with Doctor Gerone. You just take care of this stuff."

"Okay, well have a good trip." Painchaud gathered up the videotape, some papers, and the stack of photos, and carried them downstairs to Strather's lab. Inwardly, he sighed. The plan was going very well, and there were times when he could

almost work himself up into the same fever of excitement that he first felt when he joined up. Right now, though, all he could think of was the tedium of working up a bunch of animated graphics sequences to add to the presentation. Somehow he expected terrorism to be a little more exciting.

"It's because you're getting old," he told himself. "You're calmer now, more mature, more rational. You don't get carried away with things they way you did then.

Painchaud was twenty-four.

Painchaud's parents had run a produce stand in the Atwater Market, close to the few remaining English speaking districts in Montreal. Working there after school, selling cos lettuce, white radishes, and haricot beans to the arrogant English Canadians had helped solidify his penchant for French Canadian nationalism. Not that the stupid bastards actually knew they were arrogant. They simply believed that the French, because they had a different religion and dialect, must be lesser beings.

He had joined the student chapter of the Parti Quebecois shortly after arriving on campus, but by then the Parti had had its heyday, and even the hotly debated Meech Lake accords were already ancient history. The separatist movement had run its course. His political involvement was mostly confined to boozy, late night discussions with other students. Until he started working for Strather, his own nationalistic desires had remained buried. And then the CORE group had contacted him. Not a political party. Definitely not a political party.

The computer lab was fluorescent lit and sparsely decorated. The Cray VMPP was housed in a large round tower in the center of the room. It was a featureless cylinder, painted flat black. The circuitry in the Cray threw off a lot of heat, and the black paint helped radiate it into the room, where the air conditioning sucked it out. A large circular padded bench surrounded the tower. The bench had been designed for three functions. It housed the power supply for the computer. It provided a place to sit. Its most important function, above all else, was to keep custodians from bumping the machine when

they mopped the floor.

Custodians were not allowed in Strather's computer lab.

The rooms held two Compaq workstations and a Sun Microsystems advanced graphic workstation. The Compaqs were used to prepare the data and feed it into the Cray, and the Sun was used to process the data that came out. Painchaud had to admit the old man was right. The mass of numbers that came out of the Cray was impossible to comprehend without some sort of visual representation. Nonlinear equations were difficult subjects for the mind to grasp. One really needed pictures to put it all together.

Painchaud loaded up a database program on a Compaq and started entering numbers. He had done so much of this that he had developed an intuitive feel for the data, and even without computer processing, the thermoclines and the attractor began to take shape in his mind's eye. He felt some of the excitement come back. The plan was working. Strather was gone, off to his drilling project. For over a month he'd be in Antartica, clear on the opposite side of the globe from where the real action was taking place. He still didn't know that copies of his research, his programs, and especially his precious, still unpublished equations, were being passed along by Brian Painchaud to a chap called Michael St. Vincent. And also that Russian fellow.

He'd been suspicious of St. Vincent at first. The man was not of French descent. He was Catholic, though. And Painchaud had fallen in love with the plan the moment Borski had outlined it to him. It was big. It was daring. It was dangerous. It was French Canadian. It would change the world.

He made a few changes to the graphics file. He'd probably never get his doctorate. But that was okay. A piece of sheepskin was trivial when one considered the enormity of the project he was working on.

He smiled to himself and continued typing.

# # #

Ivan Nataskovitch looked out from his fourth story office at the steel constructions all around him and grumbled, "Ice!"

There was, in fact, little ice to be seen. Vyborg was farther south than Murmansk, on the Finnish border, and the Gulf of Bothnia would not freeze for some time yet. Below him, the shipyards looked busy only to the inexperienced eye. Workers in insulated coveralls bustled about, puffs of steam coming from their mouths, and from the exhausts of the gasoline fork-lifts and loading equipment. Showers of sparks sprayed from heliarc welders. Two vast Shelf class drilling platforms protruded from the choppy waters of the harbor and reached skyward. Not far away, painters sprayed a new coat of primer on the deck of the *Kolskaia* jack-up rig. Closer in, great snakes of electrical cable ran to the *Valentin Sashin*, a drillship recently repaired after an accident three summers ago, and now being outfitted with new positioning equipment purchased from Finland. The shouts of the workers in the cold air, and a constant hammering din, rose to the window of the soot streaked concrete building.

Nataskovitch knew, however, that the shipyard was working at less than half of its capacity, and that much of what was going on below was maintenance and repair, rather than new construction. Even the repairs were far short of what they should be. "Ice," he muttered again. "Ice is the enemy. It is strangling us."

"Not for long," said Borski.

Nataskovitch turned on him. "Bah! How much longer can we wait? Each day our equipment deteriorates more. I have two icebreakers laid up now. I cannot afford to operate them. I cannot afford to buy the parts to fix them. Without icebreakers we cannot keep our ports open for shipping. Without shipping, we cannot generate the money to fix the icebreakers. You see the situation? We are being closed in and crushed by ice."

"Ivan Nataskovitch, you are not telling me anything that any Russian already does not know. Icebreakers are not a solution any more. Even if they were all working. Over the long run, we cannot be competitive with a European port that does not have the expense of icebreakers."

The office was not luxurious. Borski sat in a plastic chair

with steel pipe for legs, facing a metal desk that was painted battleship gray. It held two mugs of tea and a pot of strawberry jam. A swivel chair faced the other side of the desk. The floor was linoleum. On top of the desk was also a servicable IBM PC, not a recent model by any means, but it ran the Lotus spreadsheets well enough to tell Nataskovitch the bad news.

"We need the icebreakers to get the tankers of oil from the production platforms to the ports. Then we need them to escort the platforms themselves in before the pack freezes."

Borski stirred another spoonful of jam into his tea. "My suggestion is that you sell your icebreakers now, while you can still get some sort of price for them."

Nataskovitch had spent most of his career as a bureaucrat in Russia's enormously complex and convoluted civil service. He had done well enough in meeting his production quotas, and hammering out agreements and timetables with the steel and construction mafias. And he had negotiated several very large purchases of ships and oil exploration equipment from Finland and Norway, especially the ice-resistant sleeves for the legs of the offshore rigs. Still, his years as an apparatichik had not prepared him for the challenge and cut-throat competition of free market business. Nataskovitch had reached the position that Russians called a *bolshoy chirey*, a big boil about to burst from pressure.

Borski continued. "We are on the verge of a great economic breakthrough, Ivan. The *Rodina* will enter a golden age, an era of prosperity undreamed by anyone in our history. Now is not the time to be distracted by short term problems in cash flow."

"Oh, be quiet. It is when you are being visionary that you make me most nervous." Nataskovitch paced back and forth in front of the window. "Have you talked to Aleksander yet?"

"Tomorrow."

"He wants fast results. We have had a poor growing season, he says."

"And he already knows that there is nothing we can do that will help him this growing season. I will tell him again

tomorrow. Do not talk to him again. Not over the telephone. We want only face to face contact, nothing that can be intercepted or traced."

It was one of the weak points of the project and Borski was well aware of it. His little ensemble of renegade Russian entrepreneurs had no experience in running a large covert operation. Years of operating under communist rule had taught them how to cut through the tangle of red tape and get around bureaucratic roadblocks, how to expedite business with a bribe, a gift, a favor for a favor. These were still useful skills, now more than ever. But they had no training in clandestine operations, nothing that could ever hope to fool a professional intelligence organization, if they ever came to the attention of one.

Still, Borksi was determined to do what he could. His group wrote nothing down, and minimized telephone contact. They had not met again, except with Borski, after that first time at the Aral sea. He remained the single point of contact with the Canadians. And aside from that, he depended on his people to act perfectly normally, knowing the inefficiency of the Russian government, the vast amounts of goods siphoned off into the black market by the Russian mafias, the lack of computerized record keeping, and the general tendency of the Russian worker to do as he was told without questions, would allow their operation to remain undetected for years.

"He called *me*," Nataskovitch insisted. "We did not talk about our project, not directly anyway. He wanted some barge transportation."

"Can you get him some?"

"As a matter of fact, yes. I have some barges that were to be used to move some drilling pipe. Except the pipe is not available, so I may as well release the barges to Aleksander." Nataskovitch drummed his fingers on the desk. "I think he already knew the pipe would not come. His sources are very good for this sort of thing."

Borksi nodded. "I will also need some transportation. When

can I get the helicopter again?

"The helicopter is out of service indefinitely."

"Indefinitely?"

"It needs a new fuel pump. Or something of that nature. I am not a mechanic. Anyway, there is a shortage of spare parts for the helicopters. Also there is a shortage of trucks to deliver the spare parts that are available for helicopters. And there is a shortage of spare parts for the trucks. And none of this matters to us, because we do not have money to buy more spare parts. We must keep putting every ruble into parts for the platforms. If we do not continue to bring in the oil, we will lose our cash flow entirely."

"You must keep the helicopters flying to service the platforms."

"I know that. I intend to buy more parts as soon as we get the next payment from the Canadians."

"Our Canadian partners will not make a payment until we make a delivery."

Nataskovitch made a "tchah" sound of impatience. He sat down at the metal desk and picked up a pen as though he intended to make some notes. He saw Borski look at him disapprovingly and pushed the pen away. "All right. I am working on transportation. I will let you know when I have something."

"I need something fast," said Borski. "Something hard to track. And reliable."

"Fast I can give you, I believe. Reliable, well, it will be as reliable as anything else these days."

"That's good enough then."

"I don't know why they cannot supply us with transportation."

"They are doing everything they can. You must remember that their resources are limited also. And we have something of an advantage. There is enough confusion in our industry and our economy to mask our activities. They must be more careful to maintain a cover. This is not an officially sanctioned project

on the part of their government."

"Nor on the part of our government, such as it is. I must admit I am not confident at all about giving this sort of help to people I have never met."

"It would not be wise for you to meet them. We are trying to minimize contact, remember?"

Nataskovitch picked up his pen again and waved it at Borski. "Yes, Anton. You're right. It would not do for me to be personally associated with terrorists. The whole project could blow up in our faces."

Borski hesitated at the term 'blow up.' He looked at Nataskovitch's face, trying to decide if Nataskovitch was making a joke. The man's face was impassive.

# # #

"You look very nice," said Vivian Danello.

"Well, you don't have to sound surprised about it," said Lottie. She was wearing a pale blue silk blouse and a black wool skirt. It was chilly outside, but she had opted not to wear a jacket, sure that she could make it from the car to the front door without undue discomfort.

"I'm not surprised. I think it's just nice that you look nice. It's so different from those sweatshirts you usually wear."

"I like sweatshirts." She followed Vivian into the kitchen. Joe and Vivian had a duplex in the north of Washington, a two bedroom with high ceilings, a gas fireplace, and white stuccoed walls. It was close to the Metro, which made a convenient commute for Joe, and also for Vivian, who held a civilian position with the Defense Intelligence Agency. But its most important attribute was a large kitchen, which suited the couple very well. Although the rest of the home was fashionably furnished, Lottie had soon learned that in Italian households, the kitchen was the center of activity.

Two large pots, one of pasta, and one of sauce, bubbled on the stove. Something was cooking in the oven and something else, in a casserole dish, could be seen through the window of the microwave. Joe was in the kitchen already and so were

Macpherson and his wife Martha, whose hair was exactly the same shade of gray as Mac's. Each of them was holding a glass of wine and a piece of Italian bread. Vivian pushed a glass of wine into Lottie's hand. "So where is Larry?"

Lottie frowned at Joe, who simply shrugged. "His name is *Lawrence*. He's working late tonight. It's their special issue on horses."

Martha looked interested. Vivian caught Lottie's guarded tone and dusted her hands. "If you don't want to talk about him, don't." Lottie knew this meant she would be grilled after dinner.

"How's Vicky doing?" she asked Martha. From her frown, and Mac's pained expression, she knew the news was not good.

"Two more. She actually went to the police this week." Martha shook her head and sighed. "She said we killed them as part of a Satanic Ritual."

The Macpherson's daughter was suffering from False Memory Syndrome. She had gone to a therapist to because of insomnia and come back with 'repressed memories' of childhood incest. For months Vicky had been calling her parents with increasingly bizarre stories of Satanic child abuse and murder, freshly remembered after each session with her incest survivors support group.

"What's body count up to now?"

"Twenty seven, counting these two."

"We talked with the police detective," said Macpherson. "He said her insurance will run out in six more weeks and she'll probably leave therapy. Once she leaves therapy, he says, she'll probably return to normal."

"Sounds like a lot of trouble just to get over insomnia. Of course, if the alternative was giving up coffee, I'd probably consider it myself."

Vivian had been bustling around the kitchen. She pushed a bowl of salad into Joe's hands. "Put this on the table, will you, honey."

"Let me help."

"No, Lottie. Here, have a piece of garlic bread. Have you lost weight? I know how you girls eat all the time. Lean Cuisine and Diet Pepsi. That's not real food. You're going to make yourself sick, eating like that."

"I haven't lost weight." Lottie took the bread, because she knew from experience that Vivian would not relax unless everyone in the house had food in front of them. "I wish I had. I've started a new aerobics class, though. This one is really something else."

"Those classes never worked for me." Vivian tasted her sauce and added some more rosemary. "I joined three different health clubs and I never lost any weight."

"It's not enough just to join the health clubs, you actually have to go to them."

"I don't have time. Joe, taste this sauce. Does it need more basil?"

Danello tasted it. "No, it's fine."

"You think?"

"It's fine."

Vivian tasted it again. "It needs more basil."

Martha said, "Lottie, I hear you're going up to Canada."

"I don't know yet. I'm running down a data trail, but I don't know what I'll need in the way of field work."

"I was surprised at the amount of prejudice there. We were there just last spring. Mac was fishing and I went shopping in Montreal."

"I offered to go shopping with you," Macpherson said.

"You just wanted to visit Waldman's Fish Market."

"It's the largest fish market in North America."

"How exciting. Anyway, I was just amazed at the way some people there disparaged the French Canadians."

"Well, some of the Parti Quebecois types are really a bunch of nuts," said Danello. "They're trying to get this hydro- electric plant that's going to flood about twenty percent of the whole province."

"Why?"

"They wanted their own plant for when they achieved independence from Canada. A lot of them are still into that. And then they also kicked around the idea of joining the United States."

"Oh, of course," said Lottie. "If you want to get away from prejudice and discrimination, this is the place to come to."

"Well, they're white. They wouldn't have anything to worry about."

"What are you talking about? The whole world hates the French. It's one of the few cultural constants."

"Everyone hates the french French. French Canadians are much nicer. Who would you rather have seen commanding the Enterprise, William Shatner or Gerard Depardieu? To me, there's no question."

"French Canadians just seem nice because you're comparing them to English Canadians, who are a bunch of elitist, upper class snots."

Macpherson shook his head. "You know, Lottie, one of the drawbacks of the Equal Employment Opportunity Act is that someday I'll have to promote you to a position where you'll actually be in contact with the general public. I can just picture you saying something like that at a press conference."

"Ah," said Danello. "But she'll have data to back it up."

"Well, I think we underestimate the Canadians," said Martha. "They seem like such a mellow, easy going sort of culture, but the Royal Canadian Mounted Police can be quite mean. And Canada has a very nasty secret police, too."

"Canadian Internal Security Intelligence Service. Lottie will have to be careful not to get on the wrong side of them. The RCMP got in trouble for abusing its power, so Parliament created a new force with power to do the things it didn't want the RCMP to be allowed to do."

Dinner was ready and Vivian hustled them all into the dining room, while Joe refilled their wine glasses. Once they were seated, though, she picked up the thread of conversation. "Lottie, Joe says you're looking for some missing uranium. Do

you think terrorists got it?"

Lottie had just filled her mouth with linguini. She said, "Mmmph."

Macpherson answered for her. "Terrorists with nuclear weapons make good movies, but no one really worries about them. They wouldn't do it. Not that it's impossible, just that it's not worth their trouble."

"We know that the PLO has spent a lot of time looking into the possibility of making an atomic bomb," said Danello. "So has the IRA. And they've said, "The hell with it.""

"Too difficult to work with," said Lottie.

"Exactly. Uranium oxide? You need a hell of a lot of equipment to purify the uranium. Even if you had weapons grade material to start with, it's got to be machined in a bath of special oil. You've got to have suits and glove boxes, and a special building to contain it, and explosives to detonate it, and in the end, what have you got? The best a terrorist is going come up with is a sort of nuclear pipe bomb. An atomic squib."

"It might take out a few blocks," said Lottie. "If you were a terrorist, you'd be better off spending your money on a truckload of plastic. Which, unfortunately, is exactly what terrorists do."

"I know where it's going. They're going to bring back luminous dial wrist watches," said Danello. "That's my theory."

"Good thinking. We know Canada has always been on the forefront of accessory fashion. Come to think of it, didn't a Canadian invent the mood ring?"

"Atomic mood rings! We've figured it out! Those clever fiends. What will they think of next?"

"I actually wish that terrorists would try to build atomic bombs. It would waste a lot of their resources and probably kill more of them than the Mossad."

"What I want to do," said Lottie, "is pull up some data on their oil industry."

"Why? Have you found a connection?"

"Not really. There's an oilfield equipment company called

the CORE group. It's a very big company, they do a lot of energy related things, and they supply a lot of equipment, and haul it around. It's what they call an integrated energy company, they've got projects in oil, hydroelectric, gas turbines, even some geothermal."

"And nuclear power," said Vivian.

"I'm getting some hints that a lot of the MUF passed through their hands at some point."

"You need to talk to Carlyle."

"We talked to him this morning."

"Domestic Resources has a handful of stringers working the Canadian oil patch."

Macpherson and Lottie were not expecting this and even Danello looked surprised at this information from his wife. He accepted it, though. The DIA rivaled the CIA in both budget and scope of intelligence, and Vivian had more than once popped up with useful tidbits of information.

"Carlyle reminded us the CIA isn't permitted to spy on Canada. He made a big deal about it, in fact. That's why we're doing this. He had to shut down his Canadian *reseaux*."

"They don't," said Vivian. "But they are still allowed to interview American businessman returning from abroad. Domestic Resources knows a bunch of Americans who live in Canada, but just happen to return for visits regularly, and when they do, they come in for an interview."

"Huh," said Lottie.

"I'll talk to Carlyle tomorrow," said Macpherson. "Lottie, let me know what you need."

# # #

Montreal was completely and legally bilingual. Ottawa was completely and legally bilingual. Yet, mused Jean Rais, when one drives from Ottawa to Montreal, there is no doubt that one is passing from an English city to a French city. They had put back more of the English street signs, but the chatter on the pavements, the hand gestures, the attitude of the waiters at La Charade, were all unmistakably Gallic. And then there were the

cab drivers. English speaking drivers simply did not drive like that.

Although today he did not take a cab. He had left the Solicitor-General's office after lunch, driven to Montreal, and parked his car at the Complexe Guy-Favreau — it was a Federal office building and his presence there would not be unusual — and then walked to the Montreal Metro station at Place des Arts, the large, government subsidized theatre complex. McGill station was only one stop away, but getting on and off the train, and wending his way through the evening crush, gave him a chance to shake off anyone who might be following him.

There was no-one following him, at least, no-one that he saw. "But you never do see them," he reminded himself. He had read that in a John Le Carre novel. Best to take precautions.

Just beyond the grassy campus of McGill University was the Hotel Quatre Saisons, and two blocks beyond that, the Ritz-Carlton. Rais hesitated before going in. The Paris Cafe at the Ritz-Carlton was a favorite spot for power dining among Canada's political elite. He did not want to be recognized entering the hotel. But there was no avoiding it and he crossed the lobby without seeing anyone who knew him and took an elevator to St. Vincent's suite. The door was unlocked and he turned the knob gently, then pushed it open without knocking. St. Vincent was standing at the window with a mug of tea in his hand, looking out at the Musee des Beaux-Arts. He said, without turning around, "Hello Jean. Cup of tea?"

"Yes, thanks." There was a three gallon silver urn on a sideboard and Rais helped himself to a cup, then added milk and maple syrup. A tray of pastries also sat on the sideboard. About half of them were gone. He looked up to see St. Vincent watching him, so he gestured at the pastry tray.

St. Vincent said, "Yes, the others are here already. They're watching the video." The suite had four rooms; a living room, a conference room, and two bedrooms. He nodded toward the

conference room door and Rais became aware of a faint babble of noise from within.

"Have you seen the video?"

"No. I know what is on it, though." St. Vincent was breathing rapidly and shallowly. He had arrived only that morning from Ellef Ringes in the Arctic Islands of Canada, and the centrally heated air of the Ritz-Carlton seemed unpleasantly stuffy to him. He sat down and forced himself to take a deep breath.

Rais sat down also. "It's a very good video. Our lad at the University did an excellent job of it. I must admit it is very cleverly done. I do think it makes our project so much more understandable when you can see it on the screen like that."

"He didn't make it for us. Strather assigned it to him for some sort of seminar he'll be giving."

"Yes, I knew that. But it is fortunate that Painchaud gave it to us. It keeps the money coming from the others. I rather think their interest was starting to flag."

St. Vincent agreed. "It has been a long time getting to this point, but we are very close. Is Strather out of the way?"

"Oh yes. He should be in McMurdo Sound by now. He is a long way away. And Painchaud can freely access his data until he comes back."

"You've checked on that?"

"Of course." St. Vincent seemed so calm, so genial, that it was hard for Rais to believe he was talking with one of the richest men in North America. St. Vincent had taken a modest drilling and oil exploration company and turned it into a large and successful drilling, mining, refining, shipping, and equipment manufacturing energy company. Someday Rais expected to see another side of St. Vincent, a dynamic robber baron type who could build a company like the CORE corporation, and then use it to carry out a project like the one they had.

"I imagine his seminar will get a lot of attention. How is security holding up?"

Rais spread his hands. "Once again I have nothing to report."

"I'm glad to hear it."

"Nothing from CISIS, nothing from the RCMP, nothing from the Prime Minister's office. For a project with this many people, the degree of secrecy had been amazing. I commend you."

"The International Atomic Energy Agency?"

"No audits planned."

"The Organization for Atomic Energy and Development?"

"They have accepted our records as authentic."

"You sound disappointed."

"I would like to feel like I earn the money you pay me."

Rais underestimated himself. His position in the Solicitor General's office gave him access to most internal security documents. Having an inside man in Canadian domestic intelligence allowed St. Vincent to plant with confidence. "You are earning every cent, Jean. It is valuable to know that we are not the object of suspicion. Borski tells me the first of the bombs are almost ready. He is arranging transportation now."

"How are things going at your end?"

"A little behind schedule, but we will have the last of the support platforms ready and in place before the last of the bombs are ready."

"So we will have to make another payment soon."

"That will be no problem. I don't want to sit on these bombs any longer than necessary. As soon as the last one arrives, we set it in place and go."

"These are perfectly safe bombs, Michael. If you need to spend a few days checking them out, I'm sure it will be all right."

St. Vincent stretched his legs. "It will not be all right from a security standpoint. Russia is chaos. Everyone has spies, and everyone has inspectors, and everyone; the CIA, the Chinese, the Poles, the Germans, and of course the Israelis, are keeping an eye on the Russian nuclear industry. And while they are all taking inventory, Borski has kept our project secret by hiding it

in plain sight. But sooner or later some bright boy is going to notice the Purloined Letter up on the mantle. Sometimes I wish we had left the Soviets out of the matter entirely. We should have kept it a strictly . . . Canadian affair." St. Vincent almost said Quebecois, but caught himself. There was no sense in bringing partisan politics into the matter now. "We would have had more control over the situation."

St. Vincent was just making small talk. Rais knew this. It was just not possible for them to build their own thermonuclear devices, they had explored that option thoroughly. It would have taken two years, minimum, to put together a factory capable of making H-bombs. All the necessary equipment was licensed and controlled; there was no way of purchasing it in secret. And they needed to hire former Soviet scientists anyway and who knew how reliable they would be? Better to let their Russian friends take care of it. "It was not a choice, Michael."

"I suppose you are right." St. Vincent looked at the door, then rose and stretched. "We will give them a few minutes to sort themselves out, and then go in." He looked at Rais. "Our friends in Parliament will not arrive?"

"I'm afraid not. I did talk with them this morning. They're still very supportive of our project, Michael. But they have to protect their deniability."

St. Vincent nodded and they slipped quietly into the conference room. Painchaud's video was very slick and professional looking. St. Vincent appreciated it. He had given more than a few presentations in his day, and well understood the precept that a single picture is worth a thousand words.

A Sony VCR contained the computer generated graphics video, playing it onto a JVC large screen high definition television. A dozen men were in the room, seated on folding chairs. The curtains were drawn and room was dimly lit to make viewing easier.

"For every fifteen miles one moves north of the equator," said the voice-over on the tape, "the growing season starts one

day later." It was Painchaud's voice, but St. Vincent almost didn't recognize it. Painchaud had digitally altered the voice track to make it deeper and more resonant.

The screen showed colored bands, the various shades of green representing vegetation, creeping upward across a map of North America. "For every drop in temperature of one quarter degree centigrade, the frost line moves one hundred miles closer to the equator." Dark blue lines started near the top of the map and progressed downward. The audience watched in attentive silence.

St. Vincent watched the video and thought about the great Canadian paradox. The second largest country in the world, and yet it was not a country. There was no unifying culture, no national symbol, no historic sense of identity that all Canadians could believe in. It was hard to imagine a Canadian saying a Canadian pledge of allegiance, or getting excited because someone burned the Canadian flag. Only the Francophones seemed to have a cultural sense of direction.

In the end, there were only two things that united Canada. Hockey was the main one, and there was also the fear of domination by the United States. Nearly the entire population lived within one hundred miles of the border. Popular culture; movies, fast food, TV, music, designer clothes, was entirely American. Those Canadian artists who succeeded in finding a mass audience immediately left for Hollywood, where the real money was.

He turned his attention back to video. It was showing scenic landscapes covered with snow, and the audience watched with distaste. "Thus seventy percent of our land lies permanently in the frost belt. But despite the snow cover, this land is arid. Because cold air holds less moisture than warm air, this region gets less than twenty-eight inches of rain per year."

St. Vincent adjusted his tie, and the put his hands firmly in his lap. It would not do to be seen fidgeting. He wanted to get a commitment today for the next payment. One had to be calm and collected when asking for money. It was not a trivial thing

to divert nuclear fuel from the power plants.

So far, it seemed to have gone well. And there was no indication that anyone had taken special notice of the drilling operations. But, St. Vincent realized, the Cubans had probably thought the same thing about their airbase in Grenada. They woke up one day surrounded by American marines. It was best to get this over with.

"Now let us look at Russia and the former Soviet Union," the video continued. "Sixty percent of the grain fields lie above the forty-ninth parallel. Rainfall is scarce and unpredictable." The screen changed to show graphics representations of the Siberian taiga.

"The Yanks are not going to like this," someone said.

"Fuck the Yanks." The speaker was a heavyset man in the back row. "The Yanks don't mind wiping out our forests with their acid rain." Jean Rais heard this and suppressed a smile. Andre Bruyere ran one of the largest timber companies in Canada. Like most Canadian timber companies, it clear-cut old growth forests almost exclusively. Andre didn't worry about deforestation then.

St. Vincent pushed the pause button on the VCR. "Gentlemen. Allow me to emphasize that the total amount of rainfall, worldwide, does not change. It is simply redistributed. If we are willing to take a global perspective, the data indicate that the new amount of *arable* land in the world will *increase* as a result of our, um, initiative."

"The problem is that most of our people do not take a global perspective." It was the man who had spoken first. "They take an American perspective."

"Very true. And that is exactly why we need to open up our own land."

Rais nodded. "Michael, could you please continue the video."

St. Vincent hit the pause button again and slipped outside. Rais met him there. "Actually, I think it is going rather well."

St. Vincent nodded. "It helps that we are back on schedule.

As long as we are making progress, they are fine. If things go wrong, someone will get cold feet. Are we still in agreement as to what we will do if someone tries to back out?"

"Yes. I will have it taken care of."

"Until we get the bombs, which is only a matter of days now. After that it doesn't matter."

# # #

"Forget about oil. If you really want to make money, contact lens solution is the way to go. Look at this. Twelve bucks for a lousy bottle of salt water. That's all this is. It doesn't even have much salt."

"Uh, right," said Mike Daily. Two decades with the Company had not prepared him for a clandestine meeting with a pudgy woman in a Garfield sweatshirt.

Lottie finished squirting liquid in her eyes and looked around. "This is great. This is amazing. I'm really impressed." Her tone of voice left some doubt about whether she anything ever impressed her. She was looking at an expanse of tropical plants — a two and a half acre roof garden above Dominion Square. Outside the sky was overcast and a chill wind blew through the streets, but the shoppers in Dominion Square could ignore the weather. The Plus 15 system, a network of walkways connecting buildings fifteen feet above the sidewalk, linked the whole of downtown Calgary.

"They turn that into an ice skating rink in the winter," said Daily. He pointed to the reflecting pool in the center of the gardens. "They also have a little stage where musicians perform."

"Yeah, cool." She looked him over as they took the glass elevator down to 8th Avenue. Daily was in late middle-age, a weathered and burly man, made even burlier by his Eddie Bauer parka. It was a dark blue Mt. Everest style, with wolf and wolverine fur lining the hood. Contrary to myth, wolverine fur does frost up, but the natural oils allow frost to be easily brushed from it. As she watched, he absent mindedly brushed the edge of his hood, as if from long habit.

In 1969 Daily, who was working in his brother's motorcycle shop, drew number twenty-six in the draft lottery. It was considered then that any number less than one hundred was a certain bet to be called up, and Daily had decided not to wait. He borrowed two hundred dollars from his brother and took a bus to Montreal. This was not motivated so much by conscience, or cowardice, but from a general family bred dislike of military service. Daily's father had enlisted in the army during World War II, eager to do his part to defeat the Nazi scourge. He had spent the entire war driving a mail truck around a base in rural Alabama. Daily's grandfather had enlisted in World War I, eager to do his part to defeat the Hun. He had spent his enlistment guarding a fuel depot in Biloxi. Daily's uncle had served honorably during the Korean war, as a clerk typist in Fort Dix, New Jersey. All three had inculcated in Mike the conviction that two years of his life could be better spent elsewhere. To an teen-ager, two years is a long, long time.

Ten years later Daily was married, and well established in a snowmobile repair shop in Calgary. He intended to stay there, so he did not take advantage of President Carter's offer of amnesty, but that Christmas he decided he missed his family in Minneapolis. No one cared about the draft anymore, he figured, and with all the Christmas travelers, no one would notice if he drove down for a visit. His wife agreed.

They were wrong, but in a different way than he expected. The day after crossing the border, two men from the Domestic Resources division of the CIA came to his hotel. They were very polite and very friendly. America was still recovering from the 1979 oil embargo, and they wanted a man-on-the-scene view of Canadian oil production. When the interview was over, they offered Mike $200 a month to sign on as a CIA stringer. It was a nice piece of change for very little work, and Mike had agreed.

Daily now did snowmobile repair for all the big companies, with five mechanics working in his shop, and at the drill camps.

His wife kept the books, and also operated a bail bond business. The jobs that the CIA had asked him to do were few and trivial. Mike suspected they were merely to serve as a reminder that he was on their payroll. This one, however, looked to be a bit more important.

Lottie was carrying a navy blue blazer over her shoulder. She shrugged off her sweatshirt, balled it up, and stuffed it into her handbag. Macpherson had suggested taking Daily to an expensive restaurant. "He won't take you seriously if you look like you don't have the authority to run an operation. Show him you have an expense account at least."

Lottie had looked at him solemnly. "Anything for my country. No sacrifice is too great." Macpherson had sighed.

"Let's eat steak," Daily suggested. "Calgary is steak country."

"I thought Calgary was oil country."

"It was steak country before it was oil country."

It was certainly oil country now. Canada's oil companies were based in Calgary, and almost all oil companies maintained offices there. Company trucks could be seen lining the streets, Canmar, CORE, and Esso pickups, the deep red Halliburton equipment trucks, flatbeds loaded with fittings from Daniel and Crosby. They headed for Hy's Steakhouse, where most of the Calgary business community went for immense slabs of Alberta beef. It had dark paneled wood and an early Victorian ambience.

"Okay," said Mike, when their salads arrived. "The CORE company. It's run by a guy named Michael St. Vincent. He's one of the last of the big independent oil men. Kind of a folk hero to some people in the industry. Sort of the way Texans view T. Boone Pickens and Mesa Petroleum. I'm about to do some work for them up on the Arctic Islands."

"I know. That's why the Company put me onto you."

"CORE has locations all over the place. Why pick on that one?"

Lottie was using her fork to pick bits of red cabbage out of

her salad and set them aside. She looked up. "Several reasons. I've been tracking down some uranium oxide — MUF —Material Unaccounted For. It was coming off nuclear power plants, a few drums at a time. It's very hard to move anything these days without leaving a paper trail. Truck drivers pay for gas with credit cards. They charge meals. They make long distance phone calls home. Trucks and cars show up on satellite photos. Pretty much anything can be found, if you know how to sift through the data. This stuff was moved, through a very roundabout way, to a CORE warehouse here in Calgary."

"Is it still here?"

"No. It's gone and I don't know where yet. But I'll find it. I'm pretty sure it left the country, though."

"To the Arctic."

"Ummmmmmmm, no. Probably not. But just about the time it disappeared, CORE moved a lot of equipment out of that same warehouse to the Arctic circle."

"What does this stuff look like?"

"It's shipped in special containers, but they look like fifty-five gallon drums. Inside is special construction and linings, but they're the same size as ordinary fifty-five gallon drums so they can be moved without special equipment. Just ordinary fork-lifts and things like that. But that makes them easier to track, because each drum doesn't hold very much. So they needed a lot of them."

Their steaks came and Daily pondered this while he cut into his. This woman might be giving him a line of bullshit. She looked too young for the Company to put on anything that serious. And he knew that the Company often sent stringers on errands to draw attention away from the real focus of the investigation.

Still, northern Canada was pretty remote. There was room to do nearly anything. CORE's other operations these days were in the offshore fields of the Hibernia project, with not nearly the same privacy. He said, "If you want to hide something, the Northwest Territories are the place to do it.

There's a whole lot of vacant land up there, all covered with ice and snow. And then you get north of the tree line and it's completely desolate. Nothing there but the Inuit and damn few even of them."

"Yes. So, take a look around, and when you come back, tell us what you saw. I'm going to keep tracking the MUF." Lottie cut a piece of meat and played with it on the end of her fork, while she thought. "I know it's not likely, but I really hope they're building bombs."

"You hope?"

"It would really be a major intelligence coup. It would get a lot of attention for our department, and for me in particular. Remember when the Chinese tried to sell those bombs to Al Fatah in Syria? If I twigged on to something like that, I'd look like an intelligence superstar. It would be almost a guaranteed promotion, I'm sure."

"Unless we all got blown up."

Lottie shrugged. "There's a downside to everything."

"Well," said Daily. "I'd hate to see you miss out on a promotion, but I rather hope it isn't bombs myself."

# # #

In the western foothills of the Urals, and on a day when the stiff winter wind cut away the worst of the thick smoke belching from the myriad of coal fired furnaces, and if one were able to ignore the filthy and radioactive shores of the once beautiful Karachai Lake, a rather pretty view of the mountains could be had from the Chelyabinsk nuclear weapons production site. Pavel Batistein's office, however, did not have windows, and he did not miss them, for every inch of the wood paneled walls hung with framed photographs — Batistein shaking hands with various Sochi-Krasnodar functionaries, Batistein with a hunting party at Telekhanski, Batistein with Kunaev boarding his Tupolev 134, an occasional photograph of Batistein receiving some award or commendation. The Communist Party was now but a shell of its former self, its officials disgraced, its achievements vilified, its history held up to contempt, yet Pavel

did not regret a single second of his membership. The goals of communism were every bit as valid as they ever were, he insisted. It was only the path to get there that was changing.

The room was located in the heart of the large factory that had once assembled warheads for Soviet missiles. The factory itself was simply one of the many buildings that made up the nuclear weapons complex in Chelyabinsk.

Batistein was a man of early middle age who still had all his hair, and it had stayed completely dark and thick. It was his dedication to the communist doctrine that earned him his position as the manager of the weapons facility and it was that same dedication that committed him to Borski's plan. To Batistein, employment was still the right of every Soviet worker, a right as fundamental, basic, and unquestionable, as the right to breathe. But nuclear warheads, at least new ones, were now an anachronism in the Soviet Republic. The plant would have to be either shut down, or converted to peacetime use.

To mothball the plants would be to concede a permanent loss of jobs, an unacceptable choice for Batistein.

To convert them would take money.

"Do you have the bombs?" said Borski.

"These are not bombs, these are nuclear devices," said Batistein. "A bomb is something that is dropped from an airplane. These are devices."

"I will remember that. Do you have them?"

"Yes, I have them," snapped Batistein. He was feeling severe stress. Of all the members of the group, he was the most crucial. There was no way of hiding his involvement if things went wrong and no way to substitute someone else if he backed out. Borski wanted the bombs to be completed and out of there.

"I do not want to do this," said Batistein. "I am only doing this for the money, like a good capitalist. I wish now I had never let you talk me into this. If they find out about this in Minsk, I am a dead man. All our friends together could not save

us."

"By the time they find out about this, you will be a hero. If there is blame to be taken, the Canadians will get it all."

"Supplying nuclear devices to terrorists, this is beneath contempt. This is a terrible thing we are doing."

"Nonsense. This is a wonderful thing we are doing. We helping to build a new world."

"How do we know they are telling us the truth? They may be planning to blow up cities with these things, so far as we know."

"I am inspecting the sites myself, they will not explode anything. The detonation sequence is under computer control by our system. You insisted on that yourself, Pavel, and you are right. There are no funny games here, except the question of whether your bombs will explode."

"They are devices. Yes, of course they will explode. Be sure to have the money ready."

"What will you do with it?"

"We are going to do many things, Anton. We are expanding into nuclear medicine, for one thing. Radioisotopes for diagnostic testing and gamma ray scintigraphy. The market is expanding and the supply is limited. Particularly for technetium-99, for which there is, at this time, only a single source."

"Really? What is it?"

"The Chalk River reactor, in Canada."

Borski found this vaguely disturbing. Nuclear material from Canada seemed to have a way of getting around. He wondered how much else of the Canadian nuclear industry he did not know about.

"Germanium-68 is another good one. It is used to calibrate PET scanners. We plan not to only supply the radioisotopes, we will also build the scanning equipment. Of course, at first we will build it under license, until we can develop our own designs."

"That sounds reasonable. What about fuel rods for power

plants?"

"There will be no reactors." Batistein twisted a paper clip and stared at it moodily. "All thirty-seven of our nuclear power plants have been judged unsafe and will be shut down. The graphite reactors will be replaced with gas turbines purchased from the West, with money loaned from the West. The profits, of course, will go to the West to pay off the loans." He glared at Borski, as though this was his fault.

"The rest will have to have containment buildings put over them before they can be re-opened."

Soviet reactors did not have secondary containment buildings, relying instead on a system of filters to remove any escaping radioactive gas. Chernobyl had been one such plant. Sixty thousand curies of radioactive dust had escaped from the plant. In Norway and Sweden, vast herds of reindeer had to be destroyed to prevent the Lapps from eating them. Borski was not sorry to see the plants shut down and refrained from commenting.

"Also we have a contract to build the power cells for several satellites. Those run off the heat generated by radioactive decay, you know. We no longer have a decent space program but we can still build the power cells better than anyone else. These cells will go to the Japanese. They are putting up some satellites that will be in a bad position to use solar cells. I don't know why, exactly. It is not my field."

"No."

Batistein gave him an irritated look and then suddenly stood up. "Listen, Anton, do not patronize me. I know what you think of me. You think I am a bureaucrat, some sort of party flack who got his position through favoritism, and kept it after the party was gone through his mafia connections."

"I thought nothing of the sort, Pavel. And I certainly do not patronize you. However, you cannot deny that things would not have gone so well for you after *perestroika* were it not for your many friends."

"You cannot deny that you had done as well from selling

admissions to Krasnodar Science Institute to the idiot children of party managers."

"I do not deny it. And we are not here to provide a story for the *Literaturnaya Gazeta*."

Borski did not in the least begrudge Batistein his mafia connections. As an academician, he had a superficial knowledge about the incredible organization of the Russian underground economy, that controlled entire railway lines, entire harvests of fruit, vegetables, and fish. He had heard about the state factories that contained whole, totally unrecorded, underground plants for building automobiles, packing caviar, or refining gasoline.

But it is one thing to know such illicit factories exist, and another thing to see one in operation. That Pavel, an unremarkable man in all other aspects, could run such a factory was a source of continuing astonishment to Borski. And in Chelyabinsk, a top secret city, where everyone had security clearances checked again and again! It was unfathomable and Borski simply accepted his good fortune at meeting Pavel and bringing him into the plan.

Bastistein shove his hands deep in the pockets of his GUM suit and paced around the room. "I have kept my position because I am a good businessman and that is well known."

"Yes, it is."

"I studied capitalism, not from Marx, but from a modern business standpoint, and I know how it works. And that is why I rose through the Party ranks, because I studied capitalism. And the more I learned about capitalism, the more I believed in communism."

"Of course," said Borski. He hoped he wasn't in for a lecture on Party ideology. Those things had been hard enough to take when the Party still ruled. He would have to humor Pavel, though. So much depended on him.

"I will give you some economic history about the West. In 1960 the Americans took a good, hard look at their country and discovered that about thirty percent of their people were living

in poverty. They were appalled."

"No doubt."

"So they started a number of government programs to help these people lift themselves up from poverty. This was their so-called 'Great Society.' For thirty years they spent billions and trillions of dollars to eliminate poverty. After thirty years, when it came time to count the poor again, they found only ten percent living in poverty."

Borski was surprised. "I had no idea they were doing that well."

"They aren't. Those people live above the poverty level only because of the government aid they get. Take away the medicare, and the food stamps, and the Aid to Families with Dependent Children, and the other welfare programs they have and — the poverty level would be back to thirty percent, exactly where it was thirty years ago. They have achieved nothing. In fact, they are worse off than they were, because they borrowed themselves into enormous debt to pay for those programs."

Borski shifted in his chair. Endless debate over economic philosophy was a favorite pastime of Russians. Borski was proud that he was a 'real' scientist, as opposed to someone like an economist, and even during *perestroika* had avoided such discussions. He said, "I don't see your point. They set out to feed their poor and they are doing so."

"No. They set out end poverty and they cannot do it. Neither can Germany, or Britain, or Japan. When you have a market-based economy, that is as good as it gets. Then you must have a certain degree of socialism, if you do not want your people to suffer."

Batistein had not raised his voice, but his speech was building in fervor and intensity. Borski sighed inwardly. He knew the habits of the Party ideologue, and there was no choice here but to let the man talk until he had run down.

"Now," said Batistein. "You and your capitalist friends think you have found a new way to utopia. You think if we just

borrow enough money and build enough television sets, then pretty soon everyone will be as rich as a Japanese auto worker and we can all wear expensive blue jeans and go to rock concerts like in Rolling Stone magazine. But I tell you, comrade, it will not be so. It does not work in America, there is too much poverty, and it will not work here. Only communism can free us from the oppression of poverty."

"That is not so," said Borski. "And you know why. I have no training in economics, but you have, and you know why Marxism will not work."

The fervor went out of Batistein's voice. He walked back to his chair and sat down heavily. "Yes," he said. "Chaos theory. That is your favorite mathematical exercise, eh, Anton? You cannot predict the weather, and I cannot have a planned political economy. It is unstable. Without a self-correcting market mechanism, it will collapse. And it did."

"This is not such a great revelation. There have been many failures of the planning committees. We could all see this coming."

"I didn't," said Batistein. "I believed in the communist utopia. That is what I saw coming. When chaos theory proved to me otherwise, I suffered a loss of faith. A crisis of spirit."

"Then go to church. Get a real religion. The times change. Change is constant and natural. You should not have this problem accepting it. You are too young to be so inflexible."

"Hmmmph." Batistein snorted. "I am hardly inflexible. I am a communist scrounging about for capital."

"You will have it," Borski promised. "Deliver the bombs and I will bring you the money."

Batistein remained morose. "Devices," he merely said.

# # #

An enormous fork-lift, the size of a railroad car, diesel motor roaring through a broken muffler, lifted first one, and then another, of the five ton concrete blocks that lay against the assembly bay entrance. As the blocks were moved back, two workers trundled open the heavy steel and concrete doors.

Yegor Velihkov showed his pass to the guards and signed in on a clipboard. He passed between the outer doors and descended ten feet of concrete staircase, then made a right angle turn and went down another ten feet, where he encountered another set of doors.

Inside was more relaxed. Velihkov chatted with the guards while showed his pass again and signed in again on another clipboard. From upstairs they could hear the roaring of the fork-lift, a sound that abruptly cut off as the doors closed. A few minutes later a telephone rang to tell them the concrete blocks had been moved back in place.

Now that the outer doors were closed, the inner doors were allowed to be opened. Twelve hundred pounds of steel were pushed back on rollers and Velihkov entered the assembly bay.

Inside the doors the floor abruptly changed from concrete to soft, springy wood, a material deemed less likely to set off explosions or harbor a static electrical charge. While there was little danger of a nuclear detonation, it was possible that the plastic explosive in a warhead could blow up during the assembly process. If that happened, Velihkov knew, the fifteen feet of sand and gravel above his head would confine the blast underground. Of course, that wouldn't do *him* much good, but Yegor did not worry. He was a careful man.

In the locker room he changed into heavy, lead impregnated coveralls and topped them with a lead apron. His lead lined face mask he hung around his neck while he went into the break room. His partner, Volodya Konoplankinov, already had the samovar working, and he passed Velihkov the day's drawings along with a glass of tea in a metal holder. Velihkov added milk and jam while he looked over the drawings.

"Another one," he commented, and Konoplankinov simply nodded. They would be assembling the fission primary for a thermonuclear device. The parts were already laid out in the assembly room.

Velihkov did not think it at all odd that he was assembling a

hydrogen bomb at a time when his country was supposed to be disarming. Nuclear weapons systems are constantly upgraded, modified, and replaced, so over the years he had both dismantled and assembled many bombs. In any case, it was all classified and he would never find out where the warhead went to. Over the years he had stopped wondering.

In a fusion bomb the fission primary, with its core of uranium 235, detonates separately from the fusion secondary. Always warm from its release of energy, the core of uranium was surrounded by a stainless steel casing, lightly plated with gold. Around it would go the explosives.

The plastic explosive was a heavy, dark, material that Velihkov thought was more like wax than plastic. It came in thirty-two pieces that fitted together like a three dimensional jigsaw puzzle. When assembled, it formed a soccer ball sized sphere around the uranium core.

The plastic explosive itself had five layers, each a different color, deep red, deep green, dark blue, deep orange, and black. When it exploded, the pressure produced at the center of the sphere would compress the uranium beyond its critical density and initiate the fission reaction. The different layers represented a carefully designed arrangement of fast burning and slow burning explosives, contrived to maintain the detonation pressure for the maximum amount of time. This prolonged the fission 'burn,' not only so that it produced the most yield, but so that more uranium would be used up, giving a cleaner explosion with less fallout.

When Velihkov and Konoplankinov finished assembling the sphere, they would insert wire detonators into each segment, then fit a thermal blanket around the explosive to keep it at its optimum temperature. Warm plastic explosive explodes more evenly. The detonators would be hooked up to a capacitive discharge ignition system, but that was being assembled in another bay.

When the primary exploded, a radiation channel would direct intense x-rays into the fusion secondary, a cylinder of

lithium deuteride wrapped in uranium 238. Since lithium deuteride ignites on contact with air, the secondary required special handling. The secondary was also being assembled in another bay.

Velihkov did not know the design of the secondary, nor how large it was going to be. He did know, however, that a small primary could ignite a very much larger secondary. In fact, there was no limit to how large the secondary explosion could be.

# # #

The snowmobile opened up the Arctic the way the Model T Ford opened up the midwest. It became popular around the hunting and logging camps almost the day after it was invented, and it was taken seriously as working transportation after 1967, when a snowmobile salesman named Ralph Plaisted rode one to the North Pole and back. Around the camps and villages of the Yukon, the high-pitched, unmuffled revving of two stroke engines never stops.

But snowmobiles were designed as toys for rich skiers, built for speed and dash, not for constant work. In the high Arctic breakdowns are common and a breakdown away from the village or base can mean death. Mike Daily, experienced in the repair and maintenance for Ski-doos, Snow-cats, and Panteras, easily found work throughout the high Northwest.

"Fly low over the rig," he told the pilot. "Let's take a look at what they've got."

"They won't like it," said the pilot.

"They're used to it," said Daily. "You know that. They'll be surprised if we don't."

The pilot nodded, and brought the ancient, battered, Piper Cherokee in low over the rig. He was a red faced old man with a scruffy beard that was mottled gray and black; for this reason he was known as Piebald. He ran a circuit, flying passengers, pornographic videotapes, magazines, and a little dope, to the drill camps and the few remaining DEW bases. The dope business had fallen off since so many companies had gone to

drug testing. The real head cases had gone back to LSD, which was taken with an eyedropper and couldn't be detected by the standard urinalysis. But Piebald didn't have the connections yet to sell that stuff. Being a courier for The Company helped make up the lost income.

Piebald had been around the Arctic a long time. Long enough to have acquired a pair of genuine Inuit mukluks. Handmade of sealskin and caribou sinew, cured in urine and softened by biting, they were widely regarded as the best Arctic footwear. They were hard to get. He wore his constantly.

Long enough to be able to feel his way through the miserable fog of the Aleutians, following the coastline in a hundred foot ceiling. He'd once landed four thousand pounds of dynamite on the Sagwon airstrip on the Sagavanirktok River. When dynamite freezes the nitroglycerin separates out, and the Sagwon airstrip was nothing but gravel smoothed by a bulldozer.

And Piebald had been around long enough to know the story on oil field spying.

Which the oil industry calls 'scouting.' Drilling companies regularly send helicopters to scout the competition's rigs. Periodically, the rig has to come out of the hole to change the drill bit. The pipe is stacked in ninety foot racks on the rig floor. Count the lengths of pipe on the rig floor and you know how deep the well is. Get a look at the bit through high powered binoculars, and you get an idea of what type of rock they're drilling in. And if they bring in the Christmas tree, a complex arrangement of valves and nozzles, you know they have a producing well. They don't stick Christmas trees on dry holes.

"I'll be damned," said Daily. He was surprised. Instead of stacks of pipe, there were huge coils of three inch tubing. "Slimhole drilling. They must be expecting a high pressure hole."

"Could be an environmental thing," said Piebald. "Fewer connections, less leakage. Hell, Canada had a moratorium on Arctic drilling for years. They still have to make all sorts of

promises to get permission to drill up here."

Daily nodded. "Small rig. Exploratory work."

"Got some sort of windbreak around it. Never seen that before."

"Hovercraft skirt. They blow air under it with turbofans and lift the whole thing up, like a hovercraft. Then they just float it across the ice."

Despite the fact that they were off the edge of the Mackenzie trough, over ocean two thousand feet deep, this was a land based rig, skid mounted over a thick layer of ice. Pipes went down through the ice to feed the reverse osmosis plant, which purified seawater for drinking. The living quarters were modular aluminum blocks, with thick layers of foam insulation sandwiched between them, and fire cladding on the outside. A loading crane stuck out from the side.

"One security guard," said Daily, "with a dog."

"Ain't nothing wrong with dogs. Dogs are good. Dogs warn you of polar bears."

"We're too high up for bears."

Which was true. Polar bears ate seals and seals avoided the high Arctic. Where the pack was permanently frozen they could not get through to feed.

The old Cherokee was fitted with outsize tires from a DC3, and they made for a bumpy landing on the ice. Daily held onto his seat while Piebald brought the plane down. Then he tightened his boots while the plane taxied toward the drill camp.

Mukluks were too valuable to use for work. Daily wore Sorel work boots with neoprene soles that would not slip in oil. He also had gloves with palms of sueded goatskin, that remained supple in subzero weather, and mouton fur backs, so he could wipe his face without having the gloves stick to it. The drilling crews worked in enclosed rigs and got by with Thinsulite coveralls — Daily often had to go out into the really bad weather and had goose down coveralls in a microfiber shell. Cold was the enemy. You didn't take chances with it.

"That rig," he said after he bundled himself up. He found the door handle on the Cherokee, beneath a bumper sticker that said 'Freezing in the Dark Builds Character,' and dumped his tools out onto the ice. "isn't attached to shore ice. It's drifting with the pack. Now what kind of hole moves eight mile per day?"

"Don't make no difference," said Piebald. "Arco drilled this block from ninety to ninety-three. So did Phillips. So did BP. Ain't nobody found jack shit here."

"Yeah? Maybe they're re-entering an old hole. That would make more sense with a slimhole rig."

"Your old hole wouldn't be driftin' either. Well, you figure it out, Mike. I got business to take care off. I'll see you in a couple of days."

"Have fun." Daily slammed the door and the plane taxied off.

There was a shed with a handful of Ski-doos parked outside, engines running. It was common in the Arctic to leave vehicles running twenty-four hours a day, because if you shut them off the oil would freeze, and they'd have to be thawed out with blowtorches to start again. The shed was heated, and more Ski-doos were inside. Daily figured he'd be working here. He left his tools and carried his duffel bag to the crew building, where he hoped to check in with the toolpusher. On the way he heard the helicopter.

Cold arctic air is very dense. It does strange things to sound. In an gale you can scream at the top of your voice to a man ten feet upwind of you and he won't hear a thing. Yet on a calm day the air is so still and quiet you can hear your breath make a crackling sound as it hits the cold and the water condenses out of it. Today was one of the calm days, Daily could hear the helicopter minutes before it landed, so its presence came as no surprise. What did surprise him was the markings. It was clearly a Russian helicopter.

Daily had been with the CIA long before *perestroika*, or even *glastnost*. Old habits and thought patterns die hard and

he still regarded anyone from the Russia, or one of its former client states, as Someone-to-Keep-an-Eye-On. There was no point in being subtle about it. He asked the toolpusher when he signed in.

"Better get used to it," said the toolpusher, who essentially was foreman for all the work crews. "They're all over the place now. Russians, Norwegians, Finns. All sorts of joint ventures being put together. The Russians don't have any money, and their equipment is worthless, but they sure have plenty of experience in arctic operations. Especially with seismic stuff. St. Vincent brought them in as consultants." He was reviewing Daily's paperwork while he talked. A security guard was carefully searching Daily's luggage for bottles. Alcohol and non-prescription drugs were absolutely forbidden in the drill camps. Anyone caught with them was summarily fired and sent out with the next crew rotation.

There was a schedule taped to the wall behind the toolpusher's desk. It looked familiar to Daily. While he was talking, he tried to think of where he had seen one like it before. "You'll be setting off seismic charges. You're not making hole?"

"Not yet. This is research. They'll drill after all the charges have been set."

"All the charges?"

The toolpusher waved his arm, apparently meaning to encompass the whole vast, flat, featureless landscape outside. "We are setting charges all over the Arctic. Twenty-two charges all told. We've been moving this thing around for two years, setting up the explosion points and planting the transducers. These pressure transducers can detect stuff hundreds of miles away. They're going to put it all into computers and build a three dimensional image of the entire ocean and floor. It is really an immense project."

"Sure sounds like it."

The guard said, "I'll need to check your tool boxes also."

"I'll go out with you," said Daily. He tried not to be too

interested. "See you later."

"St. Vincent comes out here himself. That's how important he thinks this is."

"Really?"

"Yep. Got his own trailer and office out here. Check that Pantera with the broken ski first. The motor's still in good shape. I think it will be a quick fix."

The security guard, who introduced himself as Jack Chatterjack, said, "Aw, he'll want to eat first." To Daily he said, "I'll check your toolbox, you can find your bunk, and then eat. Tuesdays are steak days. All the steak you can eat."

"Great."

The toolpusher said, "The new cook is pretty good, but not as good as the last cook. The last cook was a terrific pastry chef."

On isolated drill rigs, there is little to do except work, eat, and sleep. Drilling companies had quickly learned that nothing, *nothing*, was more important to keeping moral up than good food.

"He died last week," said Chatterjack. "You just missed him. He could make a goddamn puff pastry like you just wouldn't believe."

"What happened to him?"

"Flying back to Tuktoyakruk. Gale came up and they had to put the plane down. Pilot busted a strut on landing. Knocked 'em both out."

"Couldn't get into their sleeping bags and froze to death," said the toolpusher. "They were frozen solid when we found them. Had to ship them back to Tuktoyakruk in a sitting position."

"That's the breaks," said Daily. He suddenly recognized the list — it was a schedule of satellite fly-overs. They went out, and he didn't look again at the helicopter. Instead he said, "I thought you guys used compressed air clappers to do seismic work these days."

The security guard looked him over and grinned. "I know

what you are thinking. Don't worry about it. They haven't even set the charges yet. And when they do we'll get plenty of warning."

"That's good," said Daily.

"Lots of people get nervous around explosives. It's nothing to be embarrassed about."

"I wasn't embarrassed," Daily said.

# # #

The nuclear pile at the Naval Development Center looked like nothing more than a large stack of dark gray bricks, a cube about ten feet on each side. In the center of each side was a yellow radiation warning symbol. Aside from those it was without features.

"*That's* a nuclear reactor?" said Lottie.

"Yep," said Donahue.

"A pile of bricks?"

"Yep."

From the outside the building looked like a small warehouse; from the inside it looked like a large garage. The squat pile of bricks sat in one corner, the rest of the space held rough, heavy wooden tables, welded steel boxes, metal tools, and the kind of equipment that would have looked at home in a transmission shop, all being moved around by dollies and electric forklifts. Heavy duty power cords, thick cables coated with black rubber, snaked everywhere, dragged from corner to corner by men in gray coveralls.

Outside, the building sat with a cluster of other, similar buildings, surrounded by several acres of very pleasant landscaping. The landscaping was, in turn, surrounded by a chain link fence topped with very unpleasant barbed wire.

"The bricks are graphite. They're machined to interlock together and form this cube. Down in the center, some of the bricks have a little uranium in the corners. And that's all it takes."

"Isn't this supposed to have a dome over it? A secondary containment structure?"

"Those are for commercial reactors. The government manages to exempt itself from its own regulations."

"Great."

"Universities that have reactors for research are exempt also. I guess, altogether, there's about sixty unshielded reactors scattered around the country. Of course, it's not like this is going to melt down."

"Doesn't graphite burn? What if you have a fire?"

Donahue looked at her with surprise. "We have sprinklers."

He was bespectacled, balding, and thin, except for a pot belly. He was wearing a white laboratory jacket — slightly grimy — and a Caltech class ring. "We do materials testing here. Here, let me show you." He stuck his fingers in a slot in one of the bricks. It slid out, like a long, long, safe deposit box. There was a small compartment cut into the far end.

"Some of these bricks have hollows in them. We can put in the testing material — let me see." He picked up a pair of tongs from a workbench and, with the ease of long practice, used them to extract a nut from a paper bag. "Here. This one is a vanadium alloy. It's for use in equipment with a high neutron flux."

"It's radioactive?"

"No, of course not. Not yet."

"Why are you holding it with the tongs?"

"Ah. Good question." Donahue dropped the nut into the palm of his hand, and them put it in the compartment in the brick. He slid the brick back into the pile. "And that is that. So we'll expose it to neutrons for ten hours, or a day, or however long the testing procedure calls for, and then we take it out and crush it in a rheometer to see if it became more brittle. Also, we'll look at the fractures through an electron microscope to check for structural changes."

"Awesome," said Lottie, trying her best to sound sincere.

"Hmmmph." Donahue was not fooled. "Well, if you were in a nuclear submarine at three thousand feet and a crucial part fractured because of neutron embrittlement, you would quickly

learn to appreciate these tests. Now, what specifically, can I do for you?"

"Uranium oxide."

"Reactor fuel. Good stuff. So much safer than plutonium. Don't tell me you've lost some."

"Not us. Canada."

"Not again. Who are they selling it to this time?"

"We're still trying to find out."

"So they've found another third world country that wants to join the nuclear club. I'm surprised they didn't go for the plutonium."

"You just said uranium was safer."

"Well, it is. Plutonium is just incredibly toxic. One tiny spec in your lungs and it's all over for you. On the other hand, it's a lot easier to upgrade from reactor grade to weapons grade. Whereas with the uranium oxide, you need a hell of a lot of high speed gas centrifuges. Of course, they could be just shipping it to someone who needs reactor fuel."

"No, it's disappeared from normal channels."

"Hmm. How about some coffee?" said Donahue.

She followed him back to his office, which was cluttered with piles of paper. Behind his desk was a whiteboard with dry markers scattered beneath it. A stack of photos, pictures of submarines, sat piled high on a chair. "I'll just clear this off for you — oops, don't look at these." He shuffled through the photos. "These are classified." He stuffed them into a file cabinet.

Lottie sat down. Donahue grabbed some papers from the desk in front of her. "Sorry, these are classified also. Um, so are these." He stood there, flustered, with papers in each hand. Finally he put them back down, took off his lab coat, and draped it over the desk. "There."

"Good thinking," said Lottie. "Americans everywhere can sleep safely tonight."

Donahue sat down. "Lottie Deno. Are you from Texas?"

"No. Why?"

"Lottie Deno was a famous Texas gambler. One-Eyed Lottie Deno. She was friends with Doc Holliday and Big Nose Kate."

"Nope, no relation."

"Do you gamble?"

"I play a mean lottery ticket. How about you?"

"Strictly poker. I suppose you've considered simply asking them."

"We," said Lottie carefully, "are not yet ready to let Canada know that we have been investigating them."

"Okay."

"What I'm looking into now is a group called the CORE corporation. Which seems to get a lot of government funding."

"Ah! The CORE group."

"So you've heard of them. They're a drilling company."

"They're more than a drilling company. They also make drilling equipment. In fact, they made some of the drilling equipment for the GISP project." Donahue sat back and put his hands behind his head.

"Um, the Greenland thing."

"The Greenland Ice Sheet Project. It had to do with studying the history of global climate changes. They drilled holes in the Greenland ice cap and took core samples of the ice. They count the striations in the samples and that tells them how much snow fell that year, or something. It's like counting the rings in trees. Right now they are doing even more holes in the Anarctic." Donahue leaned forward again and snapped his fingers. "I've got it. They're doing a MICE!"

"Mouse?"

"Megaton Ice Contained Explosion." Donahue stood up, grabbed a dry marker, and started sketching on the whiteboard. "You need a low yield nuclear device with a high neutron flux. Ideally, something like a neutron bomb. You drill a hole in the ice, you drop in the bomb. Boom! An underground lake rich in tritium."

"Oh, great. What do you do with tritium?"

"You pump it out and sell it. Tritium is going for four

hundred dollars a pound."

"And tritium is used for hydrogen bombs."

"No, no, no. They use lithium deuteride for bombs, now. It's converted to tritium during the explosion. They used tritium for wristwatches. But back to the MICE. You also get lots of deuterium, which is very handy for your heavy water reactors."

"Or for making lithium deuteride?"

"Hmm. I don't know."

"Yeah, okay," said Lottie. "Uranium, tritium, deuterium, holes in the ice, neutron bombs. My brain hurts. Sometimes this investigation *almost* makes sense, but not quite."

One thing she was sure of. The CORE group was not building a hydrogen bomb. H-bombs were another whole level of technology, and the equipment was extremely specialized. Every intelligence agency in the world would know if a country was trying to develop thermonuclear capability. She said this to Donahue.

"Absolutely," he agreed. "H-bombs. No way."

# # #

It was impossible to relax when Chatsky was around. Despite his high position, he wore the ubiquitous rubber boots of the farm laborer, pulled up over the legs of his thick wool suit, and every time the train stopped he would dash out onto the platform, and shake hands with old men in soup-stained suits and old women selling produce. Or he would run out into the surrounding fields. Holding his old gray fedora to his head with one hand, and pointing at this, pointing at that, he would examine the crops, examine the soil, examine the tractors (when there
were tractors), talk excitedly with the farm workers. Then he would dash back to the train and scribble notes in a children's blue exercise book, or talk into a cellular phone. Once he dragged Borski onto the platform with him, introducing him to a gray-haired man in a flat brimmed cap and padded jacket. "Orlov is head of a twelve man potato brigade. He is so outstanding a worker that he was made a Hero of the Soviet

Union."

Borski was impressed. It was rare for a rank and file worker to have been awarded Hero of the Soviet Union. He shook Orlov's hand.

"They work five hundred acres of land and produce five thousand tons of potatoes," said Chatsky. "That is very good. I said to him, Comrade Orlov, lease the land and machinery from us. We will give you the seeds and fertilizer. You grow the potatoes and sell them to us."

"And I said, Comrade Chatsky, that I will think about it," said Orlov, politely.

It was clear to Borski that Orlov *had* thought about it, and didn't think much of the idea. "With your own farm, you could make more money and buy a car," he put in helpfully.

"I have been on the waiting list for a car for five years."

"He will not do it," said Orlov's wife, Bella. "All his life he works twelve hours a day, and more. Now in four years he will be retired, with a pension, and he can sit on the sofa with me and play with our grandchildren."

Chatsky shook his head and led Borski back onto the train. "A Hero of the Soviet Union without a car. It is a disgrace." He flung himself down into a seat, and almost immediately bounded up again, grabbing a sheaf of production statistics and leafing through them. "You see what I am up against. They have been lied to for so many years that they no longer believe anything we tell them. And they are right. When the collective farms are short of tractors, will they still lease one to Orlov? No, they will keep it for themselves." He sat back down again and looked at Borski.

"I don't know about you, Anton. But I find that when I get hungry I also tend to get irritable."

"That is a very common reaction," said Borski. "I understand that it is connected to low blood sugar. I sometimes have that reaction myself."

"Mmm. Well, Anton, by tonight we will reach a village where the people have been hungry for some time."

Borski thought about this and decided he didn't like the sound of it. "There are soldiers on this train?"

"Yes."

He tried to look out the window, at the broad flat fields, the long dark streaks on the plow marks, and the gray sky. The window was too dirty to see through. "You are expecting a food riot?"

"I asked you to travel back to Moscow with me," said Chatsky, "because I wanted you to see a food riot firsthand."

"Oh, for the love of God . . .."

The train was pulling boxcars almost totally filled with sacks of potatoes, rye, and sugar. It had an additional car, however, one that belonged to the Ministry of Agriculture, and Chatsky had use of it. Borski had been glad to accept his offer of a ride back to Moscow, for the car had two sleeping compartments, and was comfortable and clean — except for the windows.

"Aleksander, I do not like being put into dangerous situations, especially just so you can make one of your dramatic points. We discussed this at the meeting, the last time we were all together. Before we even started we agreed that food production would be of paramount importance."

"That was seven years ago, Anton. And it has been four years since we all met together. Time flies, eh? And Ivan has been busy with his icebreakers, and Pavel with his bombs, and you have been jetting to North America, eating French cooking, and conspiring with Canadian separatists. You remember what I told you, but you do not know what it is like until you have experienced it yourself."

"Hunger?"

"A food riot. A riot that is driven not by despair, nor by anger or excitement, but by the gnawing of an empty belly. There is nothing quite like it."

"Aleksander, there is no point to this. You will have your thirty inches of rainfall. You will have two growing seasons per year. This whole area will be nothing but grain fields as far as the eye can see."

Borski realized that Chatsky had stopped listening to him. Instead he was talking rapidly into an old fashioned radiotelephone, punctuated by brief pauses where he would listen and say, "Yes . . . yes . . . I see . . ." Then he would start talking again. In his other hand he held his cellular phone. He caught Borski looking at it and winked and tossed it to him. "No phone cells in this area. Not enough foreign investment." Then he resumed talking on the radiotelephone.

"I don't like this," muttered Borski. The compartment was unheated. He and Chatsky had been sitting with their coats on. He put the cellular phone down and crossed the compartment to the samovar, which was sitting on a tray of sand. On a folding table was a bag of plums and tiny apples. Chatsky had bought them from an old woman at a railway station, nearly a thousand kilometers and fifteen hours before. "Aleksander . . ."

Chatsky hung up the radiotelephone abruptly. "Here, Anton, I will show you." He unrolled a map on the table and put his finger on the virgin soil region of northern Kazakhstan. "Here the grain is getting soaked. And over here I have obtained some spare wagons." He moved his hand to the Caucasus. "Only seventeen wagons, but I took what I could get. Hour after hour I have been getting reports on the train's progress. At Ufa the line was blocked but we held up a passenger train to get then through. And then it was empty lines all the way to Petropav."

"And they did not arrive?"

"They did not arrive because they never left. We did not get them through to anywhere. The whole thing was a deception."

Borski shook his head. "Could they simply not have said the wagons were not available? We are all used to getting the answer 'Nyet.'"

"The wagons *were* there. They were requisitioned at the last minute by the local mafia. They needed urgently to get off some fruit which was beginning to spoil. In a few weeks I will be told that the train was accidentally rerouted, and that some minor official has received a strong reprimand."

Borski could believe it. Grain still belonged to the state, but fruit and vegetables were worth a fortune in the empty northern markets.

Chatsky slapped his hand on the table. "Bah. Capitalism is a stupid method to apply to agriculture. The Americans subsidize their agricultural industry. Massive subsidies. So do the Japanese. Capitalism was developed for factories and factory workers."

"So was Marxism," Borski reminded him.

A soldier came into the car and spoke quietly to Chatsky. Quietly enough that Borski couldn't hear. Then he went back to next car.

"No," Chatsky started again and it took Borski a minute to realize that he was picking up the thread of a previous conversation. "It is not enough to have the rainfall and the growing seasons. All that will give us is a lot of fertile, empty land. We need the equipment also. The tractors, and the cultivators, and the harvesters. We don't have enough to open up thousands of hectares of new land. We don't have enough now. What we have now is breaking down, and we can't buy parts for them, and we can't retool our factories to make parts for them. Because we don't have capital." As an afterthought he added, "Some crop dusting airplanes would be nice."

"When we are finished," said Borski. "We will buy the tractors with the money we will get from the oil."

The train was slowing down. Borski peered again through the dirty glass. Ahead of them he could make out the platform and the blue trimmed houses of the village. There seemed to be a lot of people on the platform already.

"You put a lot of faith in computer modeling," said Chatsky. "That is the basis of our whole project, eh?"

Borski nodded.

"We have done some simulation work ourselves, in the Ministry of Agriculture. But with limited success. Very limited success. Crop yields — too unpredictable. Blight, disease, insect vectors. Too many random elements. Not just chaotic but

random, so the models are not really useful. All they show, in my opinion, is how much we don't know and we knew that already."

Borski was of the opinion that anything could be modeled if one had a big enough computer and understood math, but he elected not to say so. The train was coming to a stop, and the soldiers were moving forward from the troop car.

"Come with me," said Chatsky. He stood up abruptly and opened the door between the two cars. A short set of steps led to the tracks. The wagons stretched out behind and the diesel engine, gaily painted in a red, gold, and green art deco pattern, sat in front of them. The people on the platform did not look happy.

"I thought the crops were supposed to be good in this region."

"Spot shortages. Caused by equipment failure and lack of transportation." He pushed his way onto the platform and the crowd let him through, resentful but still polite. "We will watch from here."

Borski followed him as the train started slowly forward again, and pulled the wagons into the station. The crowd was thick and densely packed, with the men in front, and the women with their children more toward the back. Borski was relieved to see the soldiers around the cars, then he noticed that none of them were armed and was not quite sure if he should be happy about that or not.

One of the soldiers unlocked the nearest boxcar. There was an expectant hum of voices and the crowd surged forward. Borski felt himself pulled along but Chatsky seemed immune to the press of bodies, holding his position and letting the crowd move around him.

"Look at them," said Chatsky. "A mob acts like single organism and yet each man is just acting for himself."

"They are not armed?"

"I expect there may be a few guns around."

"I mean our soldiers are not armed."

"That would only cause more trouble."

"More trouble?" The crowd looked very grim and very tense. Borski noticed how thin the children were. True, they were not emaciated. It was not as if he was looking at victims of the Sudanese famine, but they did not have the round faces that children should have.

"Trucks will be coming to take the food to the cooperatives," said Chatsky. "The soldiers will see to the orderly loading of the trucks."

"The children have thin faces."

"It is your imagination. I said they are hungry, they are not starving yet. It is the rate of illness that you must look at to grasp the extent of the problem. When people have inadequate nutrition, they are unable to fight off infection. Death from pneumonia, in particular, goes way up. Also influenza."

It happened all at once, and it was nothing like Borski had been expecting. The soldiers slid open the door on the first boxcar. Inside were potatoes in fifty kilogram mesh sacks, and at the sight, a sudden welling of noise came from the platform and the crowd surgeded ahead. The soldiers closed ranks and put their shoulders down, to hold the crowd back. The human barricade lasted but a few moments, the thin line of military gray pushed away by overwhelming human pressure. The first of the men reached the boxcar door and climbed up, immediately absorbed two body punches by a soldier inside, and fell back into the crowd. That soldier, in turn, was grabbed by the feet and dragged into the crowd. A half dozen more men hopped up into the boxcar. Then followed some quick shoving and punching, and two more soldiers were tossed out into the crowd. A worker in a blue coat, blood running from his nose, appeared in the boxcar door and tossed down a sack of potatoes.

The crowd sent up an expectant roar. Borski felt himself jostled as the men around him moved into position. Sweat broke out on his forehead. An eager knot of people surrounded the fallen sack. The men in the boxcar came out, each with a

sack of potatoes in their arms, and tried to get away with their booty. They too were surrounded, the sacks torn open, and the potatoes dispersed into the shoving, grasping crowd.

Meanwhile more people had climbed through the boxcar door, and on the other side, someone produced a shovel and smashed a hole in the side. Pieces of wood were torn away to enlarge the hole and more people climbed inside. The potatoes were being tossed out at a steady rate now and the crowd was cheering, the mood having suddenly switched from desperation to triumph.

Someone grabbed Borski's arm. He stiffened and tried to jerk it away, but it held on tightly. He turned and saw it was Chatsky. "This is good," Chatsky yelled above the roar of the crowd. "I was afraid they were going to get angry."

The remaining soldiers regrouped around the remaining boxcars, deciding that nothing could be done about the one already open. They were right. In a minute, the entire boxcar had disappeared from sight as men climbed up the sides, over the top, through the holes, smashing the walls and pulling sacks through the openings, tossing potatoes down or shoving them into their pockets. In another minute the boxcar was empty and the sacks were making their way to the back of the crowd. Soon the sacks themselves disintegrated and individual potatoes were being grabbed for. The crowd began to disperse, its members escaping with their gains.

"And that is that," said Chatsky. "What a shame to lose the wagon."

"That was not so bad as I thought," said Borski. He was still shaken though. He had seen riots on television, of course, far bigger and far worse that this, but this was his first experience with mob action up close, and the display of raw power, the speed at which a peaceful crowd could turn into an uncontrolled, destructive mob, and then suddenly disappear, left him thoroughly unnerved.

"No, not bad at all," said Chatsky. "Let's see how our soldiers are doing." The men who had been sucked into the

mob were sitting on the ground and a corporal was talking to them. Chatsky walked among them, chatting a bit, slapping backs and shaking hands. Eventually the men got up and rejoined their comrades around the boxcars. Some walked a little bit stiffly, but no-one seemed to be bleeding. The corporal reported to Chatsky.

"Good," said Chatsky. "No serious injuries. The towns-people have let off some steam, and now we can unload the rest of the train and distribute the food through normal channels. We will arrest as many people as we can identify, anyway. Word of this will get out and we want to discourage the other towns from trying the same thing."

"This was handled very well." said Borski. He was still shaken. "I am impressed that the situation was so quickly defused. I see you have had this sort of thing happen before."

"More times than I care to remember," said Chatsky. "And before this winter is over I expect to see it again." He gave Borski a steady look. "Get me more rain."

# # #

Ice islands are common in the Arctic seas. From the air they are indistinguishable from the rest of the ice pack, but some of them cover five hundred square kilometers and extend to sixty meters thick. They can last for decades before breaking up, and make ideal bases for scientific and oceanographic studies. To drill for oil, however, a stationary platform is needed, and this is only provided when an ice island is grounded, or when it freezes to shore ice.

When this happens the drilling company goes into action. The connection between the shore ice and the island is solidified by freezing layers of gravel over the natural ice. Pieces of drilling rig are trucked out onto the ice, or flown out on Hercules 'Thunderbelly' aircraft, and assembled, or an entire rig can be moved out on air cushions. A hole is drilled through the ice island and a series of blowout preventers, collectively called the BOP stack, are set above the conductor pipe. Meanwhile divers assemble a second BOP stack on the ocean

floor.

The rig Daily was assigned to was called the *Lisa XP1*. The ice island he was presently living on was most assuredly not attached to shore ice. Nonetheless he had no doubt that a hole had been drilled through the ice island, and that a steady supply of casing and pipe was being lowered through the hole.

That was more than enough to keep Daily interested and he certainly wanted to take a look at that hole. But he ran into a problem his first day at the drill camp. He was not allowed onto the rig.

"I'd love to let you look around, but you know how it is," said the toolpusher. "Proprietary technology, they're trying to limit access, you know how it goes."

"Sure," said Daily.

The drill foreman gave a different story. "Safety regulations. Workmen's compensation, liability issues, no one goes on the rig unless they're actually needed to work there. It's the insurance companies, they're really making us tighten up."

"Sure," said Daily.

He spent two days looking into every nook and cranny of the drill camp and didn't find a damn thing worth looking at twice. He went through the dining hall and kitchen, the machine shop and tool sheds, looked in the cabs of the tractors and Nodwells, and had, in fact, even managed to get up on the rig itself, although not inside the derrick housing. There was nothing there that resembled a drum of uranium oxide. Daily did not have a radiation counter, but he had been supplied with a cache of dosimeter badges. These were unobtrusive and self developing, like Polaroid film, and he could leave them in secluded areas and come back and check them later. They showed that nothing radioactive had passed by, or that if it had, it was still very well shielded.

He saw no sign of radiation shielding or suits, no sign of glove boxes or special handling equipment, no sign of radiation counters (except his own) or gas detectors or anything else

that would indicate nuclear material was being handled, had been handled, or was going to be handled here. He had, in fact, concluded that Lottie was drilling a dry well.

But when a Russian aircraft again landed on the ice, he resolved to check it out thoroughly.

The Ilyushin Il-76 is nearly a direct knock-off of the Lockheed C-141 Starlifter. Starlifters had been popular freight aircraft in the oil fields for decades, so most of the platform workers hardly gave the Ilyushin a second glance. The plane had served a similar purpose in the Siberian oil fields, its high lift undercarriage and short take-off allowing it to deliver heavy equipment to remote landing strips.

Daily was eating in the cafeteria when the plane arrived. He laid his fork down and pulled his parka on, then hurried out to see the plane as it taxied to the end of the airstrip. The other men ignored it, except for Chatterjack.

"A Starlifter," he told Daily. "Buddy of mine once flew one of those into Coppermine."

"Yeah?"

"Came down at night into a twenty-five foot layer of gale-driven snow and racked it up. He was only a hundred yards from the radio shack, but the men inside didn't hear the crash. Likewise, he couldn't see the shack. Froze to death trying to find it."

"Uh huh," said Dailey.

The plane stopped taxiing and the first man on the ground was Anton Borski. He hurried straight into St. Vincent's office, which was housed in a small prefab building that was kept separate from the other prefab buildings.

Daily wasted no time moving in for a better look. Closer up, he could see that the plane was old, perhaps twenty-five or thirty years old. The undersides of the wings were blackened with soot from the Soloviev engines, and there were odd welds on the fuselage where exotic military equipment had once been installed, and then removed. But already metal cylinders were being unloaded from the cargo bay.

They did not look at all like bombs and yet Daily immediately felt certain that they were. They were long, silvery, metal tubes, aluminum or stainless steel, about three feet in diameter. There were no markings whatsoever on the outside.

He slipped a hand into his coat and pulled out one of his dosimeter badges. He would have to figure out a way to get it near the bombs. Then he heard voices behind him and slipped the badge back in his pocket.

St. Vincent was laughing. "Good Lord, Anton! What have you got this week? This thing is enormous."

"I have to take whatever is available. This plane was decommissioned from the army and we have been using it to move heavy equipment. The good thing is that they are still in production, so we can actually get parts for them. And for its size, it is rather good on fuel."

"Turboprops are more economical than jets," said St. Vincent.

Daily started to move away, but Borski suddenly turned to him and spoke. "I see you are looking at the sounding charges."

"Um, yeah," said Daily. "Biggest damn seismic charges I ever saw."

"Oh, we have used bigger," said Borski off handedly.

St. Vincent seemed to suddenly notice Daily and Chatterjack. "This is a new technique."

"Yes," said Borski. "It is not known through the industry yet. The shocks need to be detected a long way off. Because we are going to map the Arctic Ocean in one fell swoop. Also, the shock wave will penetrate the ocean floor. So we will get information about the bottoms composition as well."

Daily nodded. "Very useful information for spudding a well."

"Exactly." Borski seemed suddenly distracted. He stared off into the horizon. Daily looked in the same direction but couldn't see anything.

"Something wrong?"

"No," said Borski absently. "There is a satellite coming up."

At this time of year the sun never actually sank below the horizon. It did get very low, however, and the opposite side of the sky took on a gray twilight. Looking carefully, Daily was able to focus on a dot of light, moving slowly, close to the horizon.

"It will not pass over us. It is a weather satellite. One of ours. They keep close watch on the poles these days. This is where all the weather is generated."

"Uh huh."

"You are an American?"

"Um, yeah."

"I was thinking back to my childhood. I was a boy when Yuri Gagarin made his flight. Everyone was so proud, the whole country. Because we were first in space. My parents had tears in their eyes. We thought we could do anything. That we were on the threshold of a new age.

"That was the same year the Communist Party published its Third Program. It said we would achieve communism in twenty years and we believed it. We would become the number one nation in housing, in food production, in everything. I think it is like the way the young Americans felt about the president John F. Kennedy's New Frontier. Except we all believed it."

"Yeah," said Daily. "Then came Vietnam."

"And for us, Afghanistan."

St. Vincent suddenly interrupted. "How are the snowmobiles coming along?"

"Just fine. A few more days of work and I'll be out of here."

"Well, good. I'm sure you will be glad to get back to civilization. Well, we must get back to work."

They went back to the building that housed St. Vincent's office and Chatterjack went to inspect the aircraft. Daily waited for them to go in, then circled around to other side of the prefab, away from the rig and airstrip. He unzipped the lining of his parka and took out a spike microphone, which looks like a knitting needle. The shed wall had seven inches of foam

insulation sandwiched between layers of sheet aluminum. It offered no serious resistance to the spike. Daily had chosen a location for the microphone on an earlier snoop around St. Vincent's office. A space between two bookshelves kept the microphone nearly out of sight, and he had measured the thickness of the wall so he knew how far to put it in. Now he gently screwed the spike into the wall so that its tip, just the size of a pinhead, penetrated the other side.

Generally it is a waste of time to bug a target's office. The microphones themselves are easy enough to plant, the problem is that the conversation they pick up then has to be monitored, or taped and reviewed later. It is an intensive use of time, nearly all of it is spent listening to the routine and inconsequential. This time Daily was lucky. He slipped the button sized earphone into his ear and listened.

"They're so small," said St. Vincent. "I thought they'd be bigger."

"They carry them in planes. How big could they be?"

"Yes, but those are only three to five megatons. These are going to be huge. These are the biggest ever, aren't they?"

"Quite correct. The largest bomb ever exploded had a yield of sixty megatons. It was Soviet designed, of course. And these are much more powerful than even that. Although really, it is not so much size that counts, it is efficiency. Proper design, you see, for maximum yield."

"Are they clean, that's the question?" said St. Vincent. "That's what stymied us. We gave you the responsibility of making the bombs because we have to have clean explosions."

"Rest assured, my friend, that the explosion these devices produce, and I call them devices because they are not really bombs, will be as clean as any thermonuclear explosion is possible to be. The uranium is only a trigger, you see, and the actual size of it for each device is less than that of, um, one of those round candies your children buy in grocery stores."

"Gumballs."

"Yes. Gumballs. So long as you do not set them so deep as

to blow out material from the sea bottom, the amount of radioactive debris produced will be quite tolerable."

"Leave the setting to us. We have the holes drilled, the casing set, and the transponders to mark the position of the holes as they drift with the pack ice. All you have to do is detonate them."

"The computer will take care of the sequence."

"Can you check it? Sometimes the cold does strange things to electronic circuitry."

Borski chuckled. "In Russia, too, my friend, we have had a little experience in dealing with the cold."

St. Vincent smiled. "That's right. Well, the weather is still holding and we should have no problem flying. We'll start installing them tomorrow morning. Such as morning is this time of year."

Borski looked out at the October twilight. "Morning," he said musingly. "It is the dawn of a new day in Russian history."

"In world history," said St. Vincent. "The whole world is going to change."

"Yes. You know, for a thousand years Russia has been seeking to capture and control an ice-free port. Now the age old Russian dream is within our grasp."

Outside, Daily was getting chilled from remaining still so long. The weather was turning bad, with winds gusting up. Nonetheless he was quite pleased. Every word seemed to be coming through clearly. Borski and St. Vincent were speaking in French, but Daily had kicked around the Canadian Arctic for a good many years and had picked up a working knowledge of the language. He reached into the parka again, and pulled out a tiny voice activated tape recorder, which he plugged into the receiver in place of the headphones. He would give it to Piebald on his next run. The tape would only hold thirty minutes of conversation, but that didn't bother him. Daily was sure he had the information Lottie wanted.

# # #

The powerful computer networks owned by the Central

Intelligence Agency in Langley, Virginia, and the National Security Agency in Fort Meade, Maryland, are each split into duplex systems. For maximum security, each agency has a system that is totally self contained — no outside telephone or data connections are allowed. The other system is more open. Those government departments that are allowed access to intelligence can search for and download data through a complex system of secure interchanges. It was the second system that Lottie was waiting on now.

"Come on, come on, damn it," she muttered. "What's taking so damn long?" She glared balefully at her terminal.

Danello came into her office holding two styrofoam cups of coffee and a paper bag. He put one cup on her desk. "Jeez, Lottie, were you here all night?"

"Yeah."

"You look awful."

"Thanks."

"You found it, didn't you? What are you worried about? Take a break."

Lottie glowered at her terminal some more, but it continued to ignore her. She took the styrofoam cup and emptied it into a Garfield coffee mug. "Has Mac told Carlyle what's going on up there?"

"Mac hasn't talked to anyone. He took some emergency vacation. Something about his daughter suing them."

"Well, when he comes back, tell him to hold off for a while."

"Oh yeah?" Danello leaned over her shoulder and looked at the CRT. "Why, what have you found?"

"Lots of stuff! I mean, nothing! God damn it, Joe! I found lots of stuff, but none of it is quality material!"

"Why not?"

"Shipping nuclear material to the Russians? That's like . . . like . . ." She pounded her desk in frustration. "Shipping ice to Eskimos. I mean, they've got all they can ever use. They're trying to figure out how to get rid it."

"Well, if that's where it went, that's where it went. You don't

make up the data, you find it."

"Daily says seismic charges, Joe. Seismic charges? Come on."

Danello shrugged.

"I don't believe it. Here." She shuffled around her desk and pulled up a sheet of paper. "Joe, look at this. Daily sent me this schedule they had. It's a list of satellite fly-overs."

"Uh huh."

"It's got the Russian satellites listed also. Now why do they want to hide something from their own satellites?"

"Maybe they're not hiding. They're in the high Arctic. They're probably using COMSATS for communication."

"No. These are surveillance satellites. I checked the NRO schedules."

"Why worry about it? If the Russians are involved, then it's a legitimate area of investigation for the CIA. If it's only Canadians, but they're operating outside of Canadian territorial waters, the CIA can also get involved. So pass it back to them."

Lottie sat back in her chair and bit her lip sullenly. "I just want to know, that's all."

Text started flickering across her CRT. She leaned forward eagerly, then sat back again in disgust. "UNSUB! What the hell do they mean by UNSUB?"

"Unknown subject," said Danello helpfully.

"I know what UNSUB means, damn it! I mean, how could they not have a file on him! The guy is flying explosives around in a bomber, for Christ's sake."

"Who? Borski? You're talking about this guy Borski? So maybe he's a newbie. Give them a chance. They'll find out who he is in a bit. Besides, the Ilyushin Candid wasn't a bomber, it was a paratroop plane."

"What's in the bag?"

"Croissants. Want one?"

"No," said Lottie. "Anything in them?"

"Strawberry jam."

"No thanks . . . well, since I'm doing aerobics tonight

anyway . . ."

She took a croissant and turned back to her terminal. "Okay, then what about this guy St. Vincent? For one thing, he's really rich. Suspicious, right?"

"Oh absolutely. Let's tell Carlyle to put a wet squad on him immediately."

"No, really. Think about this. All great fortunes are built upon crime, right? Can you think of any billionaire in history who didn't have shady dealings in his past?"

Danello considered this for a minute. "Sam Walton."

"Well, okay, but that's only one. Besides, I'll bet they'll dig up something on Walton one of these days. Here, look at this. The FLQ. Fronte de Liberation du Quebec. Kidnaped a cabinet minister in 1970. Some members of the group were connected to St. Vincent."

Danello was looking through the file. "Rumors. Nothing but speculation. Everybody who makes a pile of money has this sort of drivel bandied about them."

"It's not totally off-the-wall. Lots of rich people have thugs on their payroll to do dirty jobs for them, and those thugs are the sort who join groups like the FLQ."

Danello shook his head.

"Okay, look at this one. Nuclear power plant in Gentilly. Some sort of half-baked light water reactor design. CORE was instrumental in pushing approval for it."

Danello was going through this file also. "Looks like it created a lot of jobs for Quebec."

"Looks like it created a lot of jobs for CORE. Half those subcontractors are owned or directed by CORE, in some roundabout fashion."

"So it was a good business deal for him."

"I'll say. It allowed CORE to expand their interest in shipping and handling nuclear material. Look, I've got thirty - seven companies listed there, subsidiaries of subsidiaries of jointly held companies that are subsidiaries of companies that are held by people who are also directors of CORE. You don't

think they're trying to hide something? Guys without access to the kind of data that we have would taken years to unravel that."

"Lottie, this is not exactly quality intelligence. You can make a conspiracy theory out of anything. You're usually more sensible than this."

Lottie pouted. "I know. You're right. I also know there's something really weird going on here." She unrolled a geologic map of Canada and studied it. She had spent the weekend pinpointing CORE's oil interests and now the map was slathered with notes in colored marking pen.

Most of the oil interests were focused on the developing Hibernia project, off the coasts of Newfoundland and Labrador. The Terra Nova, Hebron, and Whiterose fields had proven reserves of nearly 750 million barrels of oil. But CORE wasn't interested in the North Atlantic.

Instead it maintained only a minor stake in Hibernia and consolidated its interests in the Arctic Islands of Canada. The area had some promising strikes. The potential was enormous. But it was the most hazardous and expensive area in the world to exploit.

The conditions were severe, with only a sixty day weather window in which to drill. So far the only strikes had been on land and even that required specially designed, sheltered and ice-proofed rigs. Off-shore drilling was out of the question — it had been banned for decades as too environmentally risky. Canada's Department of Northern Development had eased up for a few years, permitting drillships to explore the deeper waters, but after the Valdez disaster there were few takers. It looked to Lottie like Michael St. Vincent was taking a fast trip to bankruptcy court.

She tossed the map aside. "Nuclear weapons. Russians. The North Pole. What's the connection?"

"That MICE thing?"

She waved her hand. "No, no, I checked that out. Most of the ice cap is only six to ten meters thick. You need a whole

glacier for that MICE thing."

"But you said CORE sold some drilling equipment to the Greenland people. What was that for?"

"Some sort of weather stuff. Nothing to do with this. Wait a minute! Wait a minute. Wait just a damn minute. Weather!" She sat up and began tapping at her keyboard again. "There's a guy, let's see, here he is. Strather. Trevor Strather. College professor. Montreal. A science geek. Meteorology. Had a liaison with the Greenland Ice Sheet Project. Ha! Listen to this! His research is funded by a grant from the CORE corporation." She drummed her palms on the desk. "Oh God, I'm so good."

"Aha," said Danello. "We must be getting somewhere. We all know that universities are hotbeds of civil unrest."

"Of course they are. You never hear of revolutions starting from secretarial schools."

"Secretaries control the world already. They don't need to revolt. Mess with them and they'll delete your name from the vacation schedule."

"Joe, do me a favor. Find out where this guy Strather is, and what he's been up to lately. I just remembered something. I need to check this out."

Danello shrugged. "Sure."

When he saw her again at lunch, she was leafing through a digest-sized magazine, and in a jovial mood. He sat down across the table from her and she said. "Do you really think I need to lose weight?"

"Yep."

"I do not!"

"Okay, you don't."

"Guys know they're really better off dating fat women. A fat woman might still lose weight after she's married, but a skinny bitch won't develop a nice personality."

"And you have a nice personality?"

"Well, no. That's where the argument breaks down, of course." Lottie held up the magazine. "Look. Lawrence printed my poem. And he only charged me three dollars a line."

Danello looked at the cover. "You wrote a poem about horses?"

"Oh, no. This is the special horse issue, but there's also the usual poems about loneliness, walking in the woods, and things that make you sad."

"Um, sounds great. I'll read it later." He gave the magazine back to her. She picked it up and read from it.

There wasn't any real change, it was just a heat spell,
A rain spell, a funny summer, a weather-man's joke,
In spite of geraniums three feet high
In the tin-can gardens of Hester and Desbrosses.
New York was New York. It couldn't turn inside out.
When they got the news from Woods Hole about the Gulf Stream,
The Times ran an adequate story.
But nobody reads those stories but science-cranks.

"You wrote that?"

"No, Joe. This was by Stephen Vincent Benet. Lawrence reprints old stuff, too."

"So I'm a philistine." Danello shrugged. "Listen, Lottie. Trevor Strather left McMurdo Station yesterday for West Anarctica, where they are drilling more ice cores."

"Trevor Strather," said Lottie. "Has a Cray VMPP."

Danello whistled. "Not bad. Big bucks, eh? What do they go for? Twenty million?"

"About ten million. Plus another five million for installation and the service contract."

"I'm thinking about buying a new modem . . ."

"Sixty dollars at Wal-Mart."

"Just checking you."

"And the CORE corporation bought it for him. I checked this out with Export Control."

Danello drummed his fingers on the table. "Strather is doing weather research. A drilling company operates ships, offshore rigs, of course they're interested in weather prediction."

"Joe." Lottie leaned forward. "I talked to to the company

that installed it. That computer has no outside links."

Computing time on a supercomputer was quite expensive. Universities usually leased time on their systems to help recover their expenses. Generally several departments shared time on a computer.

"His department . . ."

"Not even his department. Just him."

"Okay," said Danello. "They bought him his own, personal supercomputer." It meant this computer was doing something extremely valuable. And extremely secure.

"Let's go to Montreal," said Lottie. "I want to take a look at this."

# # #

The Aldershot leveled off at three hundred feet with no untoward incidents, headed for the Icelandic coast. It was done very quietly and smoothly, and once they achieved depth the deck felt as steady beneath Takanasha's feet as solid land. The crew was competent and professional. What there was of a crew, Takanasha reflected. The submarine tanker had no weapons systems to man and a high degree of computer control. Unless it was loading or unloading cargo, only a few men were needed to run it. The Aldershot carried four senior ratings, six junior ratings, and six engineering officers, with a total crew of thirty-six. The regular seamen consisted mostly of the cooks and stewards, almost all of whom were Goanese — another P&O tradition. It was a fraction of what a missile sub would crew and yet the Aldershot was bigger than any other sub afloat. "All the senior ratings have their own cabins, and everyone else shares a cabin," said Second Officer Shelly. "In the Royal Navy we oft times had to share bunks. This is pure luxury. Especially the owner's cabin, which is never used, except when P&O management assigns it to visitor's, like yourself, Mr. Takanasha."

Takanasha nodded — as a design engineer he was well familiar with the boat's capabilities. Cargo loading and discharge, engine operation, and crew's wages were all

automated. Even medical diagnosis was handled by computer. The boat's Inertial Navigation System and SNAPS, Ships Navigation Automatic Plotting System, would plot the most economic course, depth, and speed, and maneuver the boat accordingly. A retractable floating wire antenna kept the boat in contact with the satellite Global Positioning System. While the officers maintained the formality of rank, command and control was more realistically rendered by a committee of navigation and engineering officers.

Shelly had completed his inspection, and he and Takanasha were returning down the long, long, center passage, called the Broadway, that ran the length of the boat. Following the design of surface tankers, living quarters were all grouped aft of the bridge, with the cargo tanks forward. Partly this was done for safety, mostly for economy and convenience.

"We also have cabins for the ladies," said Shelly. "We don't have any women on board yet, but it's just a matter of time, I suppose." His voice held a touch of regret, though Takanasha could not tell if Shelly regretted the encroachment of women on a previously all male domain, or their present absence.

"Captains are allowed to bring their wives along, although I can't think that any of them ever do."

"Did all the officers come out of the Royal Navy?"

"Oh no, we've got a couple of Yanks as engineering officers, and a Norwegian. Except for the captain, we all started in submarines. They sent us to tanker school at Le Havre, to learn how to handle tankers."

Takanasha had heard of Le Havre, where tanker crews trained not only with computer simulations, but on scale model tankers that floated around a private lake. As important as navigation were the lessons in loading and unloading the oil. Each tank had to be carefully balanced, for uneven loading could generate enough stress to break a tanker in half. Cracking a tanker while loading was not only possible, in fact, but had happened, although never to a P&O tanker.

They were approaching the bridge again. Davis was the first

officer, and Thompsen was looking over his shoulder at the graphics display. The Captain did not look up, but Davis said, "We have a contact."

"Oh yes?" Shelly was interested. "Whose is it?"

"American. Los Angeles class. He's running beneath the thermocline but we picked him up on long wave sonar." Having identified the contact, the computer was now enhancing the graphics display with information from its memory. "USS Alexandria." The sub now appeared on the screen in detailed clarity. "Retractable bow planes and a hardened sail. He's got ice-breaking capability."

"Is he looking for something?" asked Takanasha. "Are the Soviets still running their submarines? I thought they pulled them all back to the Baltic and Okhotsk."

"God only knows why, but yes, they still send some out," said Thompsen. "Those they haven't sold yet to the bloody Arabs. The Ukraine sends one out occasionally, and then the Russians send one out to tail it. The Yanks pick them up if they approach the Greenland SOSUS barrier and then they send out subs to tail them. And thus employment levels are maintained in Navies across the world."

"That is a hunter-killer class submarine. Can he hear us? He is beneath the thermocline and we are above it. The thermocline will reflect the sound waves, is that correct?"

"For God's sake, man, I certainly hope he knows we're here. We're putting out enough pings to wake the dead. I don't want some idiot shooting at us by mistake."

"He won't be using active sonar, but of course he'll hear ours," said Shelly. "He knows who we are. We're the only submarine tanker in the world, so far. Their entire boat can fit inside just one of our tanks." He was unable to keep a touch of pride out of his voice. "Everyone in there has heard of us."

Davis was making notes in the log. "He's fading off now, so the question is moot. So long, chap." He noted the time in the log.

Thompsen straightened up. "I believe it's time to dress for

dinner." He checked the log book and signed it. "First Officer Davis, it is your watch . . . hello, what's this?" The sonar had reported another contact.

The men gathered around the display again. "It's stationary," said Davis.

"Reduce speed to four knots."

Davis slowed down the screws, but the speed of the vessel did not immediately decrease. A vessel the size of the Aldershot took a while to slow down.

"It's a great long piece of pipe," said Shelly finally.

"Hanging down three hundred feet from the middle of the ice cap? Put the cameras on it."

The digital sonar image was fuzzy this time, reflecting the computer's lack of information on the object. As the Aldershot approached closer, however, externally mounted video cameras, used for inspecting the hull, were able to outline it in the glare of their spotlights. It was indeed a long length of pipe. "Turn off the lights," said Thompsen.

The screen blackened for a moment, then the object came back, more clearly now, but with a green cast. Cloudiness in seawater tended to reflect back spotlights, so the underwater cameras were equipped with image intensifiers to magnify the available light. Davis tapped a key and the graphic display enhanced the picture with artificial color. The pipe continued down into darkness.

"It's drill casing," said Davis. "Someone's drilling for oil."

"Out here in the middle of the Mendeleyev Plain? It's twelve thousand feet deep!"

"We're coming up on the Chukchi Plateau."

"He's bloody well missed the mark if he intended to hit the Chukchi Plateau."

It wasn't likely. The edge of the Chukchi was miles away. Anyone with a handheld GPS receiver could locate his position within thirty feet. The Pentagon added exponentially boosted noise to the civilian GPS system to limit its accuracy, but canny electronic engineers had figured out a way around that. By

taking multiple readings and applying error correcting algorithms, they could eliminate most of the noise. The pipe wasn't there by accident.

"Some sort of experimental station, maybe," said Shelly. "They're monitoring something from up top?"

"I suppose," said Thompsen. "It's got some sort of cable running down the side of it. Perhaps that's the instrument connection?"

They watched the pipe get closer and then fall back into the distance. Thompsen finally shrugged. "Log it and forget it."

# # #

The Universite du Quebec a Montreal had a spacious, modern campus, with wide lawns and trees that had already dropped most of their leaves. Afternoon classes were over, dusk was already falling and the campus walks were thinning out as the remaining students either left the campus, or sought shelter indoors from the cool wind.

Lottie and Danello approached the campus from the Rue St. Denis. Lottie had insisted on walking from the hotel, explaining that she needed the exercise. "I'm missing my aerobics class." It was a mistake, because the route to the university brought took them past La Chartreuse, a tiny Viennese tearoom whose counter was heavily laden with Sachertortes and butter cream cakes.

"We're walking off the calories anyway," she told Danello, after each of them put away a slice of *Dobostorte*, a pastry rich with chocolate layers and caramel icing. They resumed walking.

"Right," he said. "Where did you get the sweatshirt?"

Lottie was wearing black jeans, a sweatshirt with University of Quebec emblem on it, and a backpack of books.

"Office of Technical Service. They have them for just about every school in the world. They also have blank student ID cards."

They were carrying flash ID, which was meant only for show and would not stand up to investigation. Fully backstopped ID was too expensive and too time consuming to prepare. For this

kind of job, however, Lottie did not expect to even use the flash ID, and passports were not required for travel to Canada.

"It's pretty good," said Danello. "If you were a little younger you could easily pass for a student."

As soon as he said this he knew he'd made a mistake. Lottie came to a complete stop and looked at him. "Why? How old do you think I look?"

Danello had been married too long to answer a question like that. "That's the Natural Sciences Building over there. Meteorology is on the fourth floor. It will look like a big piece of furniture."

"Thanks, Joe. I know what a Cray looks like. We had sixty of them when I was in the NSA."

"Okay," said Danello. "You still haven't told me why you think this one is so important, aside from your personal employment bias that the whole world revolves around computers."

"They've had this thing for a year or so. I always try to keep up with who has the latest and the best, because yeah, I do have an employment bias that the people with the fastest computers will run a world full of high tech societies. But here's the big thing." She paused to shift the backpack across her shoulders.

"Remember when China wanted to buy a supercomputer and Export Control tried to hold it up?"

"Vaguely."

"China said they wanted it to do weather research also. But Export Control thought they would use it to design nuclear weapons. Apparently the types of equations used are similar."

"Ah," said Danello. "And the CORE corporation bought one for this meteorology department, supposedly to do weather research."

"And I'll thank you not to make any jokes about the study of meteors."

"Wouldn't dream of it." They mounted the steps to the Natural Sciences building and found their way to Meteorolgy. A

pretty young blond girl, no doubt a student on a work-study job, was sitting behind a desk, reading a copy of Cosmopolitan magazine, and, with a great deal of concentration and delicate care, painting her fingernails. Lottie marched right up to her. "I'd like to see Professor Strather please."

The girl glanced up. "Are you a student?"

"Yes."

"Professor Strather has undergraduate office hours from two to four, Tuesdays and Thursdays. However, you can't see him this week because he's on a field trip."

"Oh dear," said Lottie. "Perhaps one of the Teaching Assistants can help me."

"Not tonight," said the girl. "There's major exams for them tomorrow."

"So they're all off studying?"

"No, they're probably out drinking beer somewhere." The girl sounded wistful.

"On the night before a major . . ."

"Well, grad students never get tested hard, do they?. The profs would rather they spent the time working on their research than swotting."

Lottie guessed the girl was an undergraduate.

"Brian's in the computer lab, though," said the girl. "He doesn't teach, but he might be willing to help you."

"Thank you," said Lottie.

"Down that hall, then left, then it's the door on your left."

The hallways seemed to be deserted. Danello said, "Okay, what are you going to do?"

"Ask him nicely to show me all his neat meteorology programs."

"Right," said Danello, giving her an annoyed look.

Lottie ignored it. "I reviewed some weapons design software. I'm pretty sure I can recognize it if they have it." They found the door, gray painted steel with a square window in it, the thick glass reinforced with wire. The doorknob was set into a heavy, stainless steel lock. She glanced in while Danello

hung back, then took a long look. "It's empty." She pushed the door with the flat of her hand. "And it's locked."

"If they didn't lock it up it wouldn't be worth going after." Danello produced the key. He hesitated. "Have you ever done field intelligence before?"

"No. Open the door, will you?"

"Just to remind you, we haven't broken any laws up until now. Once we go in here, we'll be guilty of espionage. And Canada doesn't have the same constitution the U.S. does."

"Just open the door, okay?"

"Okay."

The key would not turn.

"Gee," said Danello. "I could have saved my speech."

"Toastmasters would be proud of you anyway. Try jiggling it."

"I am jiggling it. This is the wrong key."

The key had been supplied by an OTS installer, more formally called an audio-operations officer. Installers specialized in placing microphones, and getting through doors was part of their training. He had flown in that afternoon, examined the lock, and left the key at a dead drop near the Faubourg Ste-Catherine.

"All right," said Lottie. "There was some sort of mix-up. These things happen."

Danello was scowling at the key. "We'll have to come back. Unless there's someone close by who can pick the lock for us. I know the Company has safe houses in Vermont. There might be someone close by."

"Didn't they teach you to pick locks at Camp Peary?"

"Yeah, but that was years ago. And I didn't bring picks with me."

Lottie looked around. The hallways were still deserted. "I'll bet there's a set of master keys around somewhere. Wait for me. I want to check something."

She walked back to the lobby. The girl at the reception desk had finished with her nails and was now delicately removing

the cotton balls from between her fingertips. She looked up as Lottie approached and smiled brightly. "Did you find Brian?"

"I'm afraid not," said Lottie. "Do you know if . . ." She broke off suddenly and stared into the girl's face.

The girl cocked her head. "Something wrong?"

"Well, no, not really." Lottie leaned forward and spoke in a confidential tone. "You know, they do have waterproof mascara now."

"Oh my God!" The girl was stricken with horror. "How bad does it look!"

"It's hardly noticeable," Lottie assured her. "I wouldn't worry about it, unless some good looking guy from the hockey team were to come in, like, to ask for directions or something, and he looked really closely at you."

"Oh my God!" the girl said again. She grabbed her purse and headed for the rest room. "I'll be back in a minute."

"Take your time," Lottie said to her back. She waited until the girl disappeared around a corner, and then opened her desk. There were three large rings of keys inside. She grabbed all three rings and returned to Danello.

"How did you get these?"

"It's a girl thing. I'll tell you later." Lottie was trying the keys rapidly in succession. The tenth one opened the door.

"Jeez," said Danello. "Talk about beginner's luck."

"Mmmmm." There were three microcomputer workstations feeding the VMPP. All three had screen saver programs running on them, images of multicolored goldfish swimming across the monitors. Lottie sat down in front of one, then got back up and opened one of the cabinets to the supercomputer. She ran her finger down the rack of metal casings, circulating coolant around the circuit boards.

Danello was looking it over also. "So this is a Cray." He was strictly a PC man and determined not to be impressed. "Parallel networks are about to make these obsolete. You can get supercomputer power out of a bunch of desktops now, if you LAN them up right."

"If your company has a lot of PCs," said Lottie, a bit absently. She sat back down at the workstation and began pulling things out of her pack. "The keyboards are password protected." She tapped a set of keys. The screen continued to show goldfish. She took a small screwdriver from a wallet sized tool kit and removed a cable from the back of the workstation. "Kind of a nuisance."

Computer security methods are usually good enough to protect a machine from the run-of-the-mill hacker, but there is little that can be done to keep someone out who really wants to get in. Often the machine has already been penetrated. Early in the computer age, the NSA had begun periodically releasing viruses into the commercial networks. The viruses were mostly harmless, but then, working through dummy shareware companies, the NSA would offer free or low cost virus checkers. Once installed on the computer, the virus checker also offered 'back door' entry to any intelligence officer who knew the password.

But Painchaud was too sharp to put shareware on his system, Lottie's tenure at the NSA had been as a data analyst, not as a hacker. She preferred a method that was simple, but brutal. She'd shut down the computer, reboot it from a floppy drive, and do a low level format of the hard disk. This effectively would destroy any protection scheme that was on the computer. She would then selectively unformat those sectors of the drive that had the information she wanted. In this case she wanted access to the Cray. Before leaving, she would unformat the disk, then load the workstation's hard drive with enough garbage to make it look like the drive controller had failed. This concealed evidence of her entry.

Only recently had she decided to experiment with more subtle methods. From her pack she took a palmtop computer. It had started life as a Gateway Nomad, but had been heavily modified the previous summer, at the annual Hacker and Phone Phreaks convention in Amsterdam. She also removed a printer cable, connected one end to the palmtop, and crawled under

the desk to get to the workstation's printer port.

Danello handed her a small screwdriver. "Why did you leave the NSA, Lottie?"

"Dress code."

"Oh, right." He looked at her bottom. "Vivian says that women wear black because they think it makes them look thinner."

"It *does* make me look thinner."

"Uh huh."

Lottie's voice was muffled. "When I get through with this I'm going to bop you upside the head."

Printers take data from a computer and print it. The also send signals back to the computer, to let it know when they are ready to receive data, a process known as handshaking. The palmtop had a program that could manipulate the handshaking signals enough to provide an opening to the workstation's operating system. Lottie began typing. A few minutes later the goldfish on the workstation monitor disappeared, replaced by a directory listing.

"And that's that." Lottie ran through some of the listing and murmured, aloud to herself. "Vectorized Fortran."

"Fortran's still around?"

"*Vectorized* Fortran. Used for building the big simulations."

"What are you looking for?"

"Anything having to do with nuclear material," said Lottie. And then she made her big mistake.

She tossed the key rings back to Danello. "Joe, I got these out of the receptionist's desk. See if you can sneak them back in before she returns."

In any black bag operation, there is always one member of the team whose job is to watch the door and warn the other members if someone is approaching. This is his sole job and to leave it is one of the severest violations of operating procedure.

Lottie had little field experience, and was not inclined to follow rules anyway. But Danello should have known better. From the end of the hall, he could watch the door and still see

anyone coming from the lobby. Even though the lobby was only a short walk away, and he was back in less than a minute, he should not have left that post. But he did. And he turned the corner just in time to miss Brian Painchaud coming out of a closet.

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Dinner chimes were broadcast throughout the boat at seven, but they were for the junior ratings, who were expected to have finished eating by the time the Captain's party arrived. Punctually at 7:30, Basil Thompsen lead a procession of officers into the dining salon, all dressed for dinner in 'Red Sea Rig.' Developed for formal dining in hot weather, decades ago, on the P&O mail boats moving east of Suez, the ensemble consisted of black dress trousers, silk cummerbund, and white short sleeve shirt with the insignia of rank worn on the shoulder tabs. Takanashi wore a white dinner jacket into the dining room, which was, of course, subject to the same climate control as the rest of the boat and bore no resemblance whatsoever to the conditions on the Red Sea.

Fresh linen and printed menus in silver holders awaited them in the dining room. Goanese waiters brought the food quickly and silently; mock turtle soup, grilled sole Tartare, roast veal and stuffing, baked and boiled potatoes, and cauliflower. (Lunch always featured a curry, and it was always served with chutney, pompadoms, diced tomato, onion, coconut, and currents.) Thompsen, as ship's masters are wont to do, directed the conversation.

"I hope your company has given careful thought to corrosion control, Mr. Takanasha. If there is one thing I cannot abide, it is a rusty ship. It's an embarrassment to sail one into port."

The Aldershot would never put into port. But Takanasha merely said, "Our metallurgists were most careful choosing the steel. Provided one keeps up with the paint, the exterior should not be a problem, and the inside of the tanks will not corrode more than two percent a year, even with a high sulfur crude."

"Very good," said Thompsen. "When we are under the ice we are, I'm afraid, out of the reach of Murphy."

For a moment Takanasha thought the captain was talking about Murphy's Law, that fatalistic assumption that accidents are bound to happen. Then he realized that Thompsen was referring to Murphy Shipping and Salvage. It was a company famous throughout the industry for dragging disabled tankers from the brink of disaster.

"Bound to happen sooner or later," said an engineering officer gloomily. It was one of the Americans. "You'd think there's plenty of room in the ocean, but the computers choose the most economical course, and everybody's computer chooses the same course, so we all run right alongside each other. Soon as another submarine tanker is built we'll be looking at it over our shoulders every minute."

"We have three dimensions to maneuver in," said Shelly. "And look-forward sonar for collision avoidance."

"Aye, and the surface ships have radar too, but they still have collisions."

"What would happen," asked Takanasha hesitantly, "if . . ." He paused, halted by the absurd superstition that he was courting disaster even by talking about it. "If there was a spill? Under the ice."

"Absolute bloody disaster," said Shelly.

In the way of environmental catastrophe, there is little that can compare to an oil spill in the high Arctic. The possible consequences had kept the Arctic Islands of Canada closed for decades. The construction requirements for the Aldershot had been specified with those thoughts in mind. The tanker was double hulled, with a layer of concrete between the bottom hulls, to protect from damage in case of grounding. The deck and sail were hardened to icebreaker strength. The navigational arrays all had redundant back up systems, and acoustical sensors scouted for obstructions on the sea bottom.

"Aye," said Davis. "The oil floats up and forms a layer under the ice. It can't evaporate through the ice and it's too cold for

microbial action to digest the oil. It will be there for years."

"No waves to break up the slick," said the engineer. "In the high Arctic the pack is permanently frozen."

"Light can't get through the oil layer," said Shelly. "The algae die off, and then so do the fish. Then the birds."

"The oil plugs up their blow holes so the seals can't breathe," said Thompsen. "Poor blighters."

There was a pregnant silence. Takanasha noticed the officers exchanging glances. Finally Davis said, "Nothing can be done about it. That's why we have to be very careful that nothing like that will happen."

"Right," Shelly agreed, a little too quickly. "We just have to take every possible precaution."

"Nonsense," said Thompsen. "If there was ever a justification for using molecular machinery, that would be it."

The table fell silent again. This time all the officers were watching Takanasha. He tried to make some sense out of what had just been said. Molecular machinery? In a moment his eyes widened.

"Nanites! You mean *nanites!*"

The engineer said, "You must have seen that episode of Star Trek."

"Nanomachinery," said Thompsen. "Tiny little widgets for snipping apart oil molecules. We have a tank full of them inside the sail."

"Nanites! Great God in heaven!"

Takanasha had seen the tank on the engineering drawings and during construction. It was supposed to be for a dispersing fluid. They must be joking with him. "I have been told the first commercial assemblers would not be ready for three to five years."

"Yes, well, the Yanks do beat you chaps to the punch once in a while, don't they?"

Takanasha chose to ignore this. Shelly put in hurriedly, "It's because they don't have to assemble anything. Our nanites, I mean. It's a lot easier just to break things apart. These are

very specialized. They just break the carbon-carbon bonds. Eventually your long chain oil molecules just break down to so much coal dust."

"You won't even have that," said Davis. "When the chains get small enough they'll vaporize off. Ethane and propane and such."

"Actually you'd get ethylene and propylene," said the American engineer. "Unless you added hydrogen."

"Same difference, they'd still evaporate."

"That is not the problem!" said Takanasha. This was even worse than he feared. "All of life is made of carbon-carbon bonds! When these things are through with the oil, they will spread, they will multiply, devouring every bit of organic matter they contact like piranha . . .."

"Oh, get a grip, man!" snapped the Captain. "We rather *have* thought of these things, you know. These are not the kind of nanites that reproduce themselves. And they'll turn themselves off when the job is finished. It's all very safe."

Takanasha was not mollified. Despite its potential to reduce pollution, a number of environmental groups had come out against nanotechnology, mostly on the fear that an uncontrolled release of nanites was inevitable and would cause widespread destruction. Thus far, they had only been approved for use in very carefully controlled conditions, specifically to clean up hazardous wastes. "You don't know that they'll turn themselves off. There must be billions of them in that tank, and even if the probability of a error in the assembly code is very small . . .."

"It would invariably result in a machine that did nothing at all."

"You can not be certain of that."

"Nothing, of course, is certain."

"It's not like we'll be spitting these things out on a whim," said Shelly. "We'd only release them if faced with an environmental catastrophe."

Takanasha played with his veal for a few minutes. The

obvious next question was to ask about accidental release. What if the pressure hull was breached? What if the sub went down? But he was, at present, nine hundred feet below the surface and these were thoughts he did not really want to dwell on. Finally he did say, "What of an accidental release?"

"Not bloody likely," said Thompsen. "It takes two separate switches, one operated by a deck officer, one by an engineering officer, to pump out that tank. It's hardly the sort of thing one is likely to do accidentally."

"It's a good strong tank," said Shelly. "Well, you chaps built it, you should know. And it's further protected by being inside the sail, which is reinforced."

Davis agreed. "It would take a hell of an wallop to rupture that tank."

# # #

Brian Painchaud's hands were sweating as he loaded the gun. He normally kept it loaded in his desk, and it had still been loaded, but he couldn't resist pulling the clip out to check it. Now he slipped the clip back in and pulled back the slide to load a round into the chamber. His palms were wet and he wiped them on his pants.

Idiot! He cursed himself. Moron! Hoser! How could he have left the damned door unlocked! They were so close, damn it. Now they were blown, the secret was out, their plans were all shot to hell, and even if the police didn't arrest him, that vicious bastard Jean Rais would have him killed.

Painchaud carefully opened the office door a crack and looked out. The hallway appeared to be empty. He opened the door some more and stuck his whole head out. The hallway was empty. He slipped the safety catch on the gun.

He calmed himself down. There was still time to stop the girl. He didn't know who she was, probably CISIS, or the RCMP, but it didn't matter. Whoever sent her would undoubtedly send more people. Brian would be arrested but that was all right. He'd have time to destroy the programs, cover up his connections to Rais and St. Vincent. He'd be interrogated but

he wouldn't talk. Not at first anyway. He didn't know how bad it would get but he was sure he could hold out for at least a few days. A few more days were all that was needed.

Painchaud stepped out into the hall. His office next to the computer room was very small. It had once been a utility closet. In fact it still said 'closet' on the door, which was why Lottie and Danello had overlooked it. It just contained a desk and a phone, since no outside lines went to the computer room.

Painchaud had made a call to his girlfriend. He had intended to make it a quick call, just long enough to tell her he'd be working late, and then he'd be right back at the console. He thought that must be why he'd left the door unlocked. It didn't matter that much. The keyboards locked up after two minutes without input and then would only respond to the password. And he'd only be gone a minute anyway.

He didn't know that the lock had been installed before the computer arrived, and the carpenter had given a key to the maintenance supervisor. The supervisor put it on a ring with the rest of the building keys and forgot about it. Neither Painchaud nor Strather knew it existed.

But when Painchaud got Michelle on the line, one thing led to another and they'd talked for almost twenty-five minutes. When he came back there was a girl in the computer room. And she had accessed the Cray.

One look told him she wasn't just a student nosing around. She had specialized hacking hardware to go in through the communications ports and you didn't pick that stuff up at Sharper Image. The girl was a pro. He had to get rid of her.

The computer room door was ajar. He eased it open silently. The girl had her back to him. She was deep in concentration and didn't turn around.

"Well, Brian," he told himself, "You always wanted to be a real freedom fighter and here's your chance."

It takes a certain type of mental disassociation to confuse terrorism with freedom fighting, but Brian Painchaud possessed it. He had wanted to fight for freedom ever since he was a boy,

reading about Hemingway and the young intellectuals who had fought in the Spanish civil war. The problem was that there were no good causes to fight for anymore. The FLQ had shot their wad when they had kidnapped Pierre Laporte in 1970. The RCMP burned them to the ground. The IRA was more of an organized crime gang than a terrorist movement, and their sort of Marxism was dead anyway. Same thing for the groups in southern Aftrica and the Palestinians were a bunch of jerks. And though there were plenty of other revolutionary movements going on in the world, they all seemed determined to set up some sort of Islamic dictatorship and who the hell could get behind that?

He raised the pistol, but his hand was shaking so much he had to grip his wrist with the other hand to steady it. Both sets of knuckles were white. The girl did not turn around.

He had taken a trip to Spain, and shortly after returned, much disappointed in the Basque movement. They weren't anything like Hemingway's revolutionaries. He had enrolled with the Parti Quebecois. It wasn't much of a movement anymore, but at least it was close to home and a cause he could support. And then one day he'd been drinking with one of his professors. The professor had quizzed him about his attitudes towards the English speaking Canadians. Painchaud had replied with drunken vehemence. Sodding bastards with their snobby obsession with class distinctions. Where the hell did they get off? The professor had nodded, and a day later Painchaud had been contacted by one of Jean Rais's people. A week later he was working in the meteorology department.

He realized that the safety catch on the gun was on. He had been nervously clicking it on and off in the closet, and apparently had still been doing it, unconsciously, in the hall. He looked at the girl's back and then pushed the safety forward with his thumb. It made a quiet, understated "click."

# # #

The lobby was still empty and Danello opened up the center drawer to the receptionist desk and dropped the three rings of

keys into it. He did so with some reluctance, thinking that it would be worthwhile, as long as they were here, to search Strather's office also. But that would take time, he decided, and it would be better to just come back when they had their own keys made. The correct ones, this time. For now, Lottie seemed to know what she wanted, more than she was telling, and Danello was just going to follow her lead. She had a long history of being right and getting results.

He went back to the computer room, uneasy and walking quickly, knowing that he shouldn't have left Lottie alone. He turned the corner just in time to see Brian Painchaud enter the Cray room with a gun.

"Shit," said Danello under his breath. He had a tiny can of pepper gas on his key ring and he burst into a run, fumbling in his jacket. He got the key ring out and flipped the safety cap up with his thumb; at the same time he jerked open the door to the computer room. Stepping in, bringing the pepper gas up to eye level, he heard the click of the safety and realized he was too late.

And then Lottie leaped from her chair and launched herself forward as though she had been fired from a cannon. Her arms moved so fast Danello saw only a blur of fists, and he heard WHOP WHOP WHOP WHOP and saw Painchaud's head jerk back four times. The student stumbled backwards and fell, his head hitting the floor with a distinct crack. The pistol clattered from his hand. Then Lottie was standing over him, her fists still clenched, her breath coming in short hard gasps.

Danello stared at her, at a loss for words. He leaned forward and picked up the gun, and finally came out with, "What the hell was that!"

Lottie had to take a few more breaths before she could reply. "Aerobic boxing."

"Aerobic boxing!"

"I hold the club silver medal for free sparring."

Danello looked at the body on the floor. "Aerobic boxing. I wonder if Vivian knows about this." He put his pepper gas back

in his pocket. "Aerobic boxing. Jesus Christ." He felt for the kid's pulse. "He's alive. Let's get out of here. Did you find what you were looking for?"

"No. There's just some sort of big weather program."

"About what you would expect from a meteorology department."

"Don't get smug. I downloaded it anyway. We'll check it out." She unplugged her palmtop and stuck it and the cable back in her bookbag. "There's too much security here for just a weather program. I want to take a look at it."

By the time they got back to the hotel they were both calmed down and talking normally. Danello took Painchaud's gun out from under his jacket. "Do you know what this is?"

"Let me guess. You're going to tell me that this is one of those famous Glock pistols with the plastic housing, supposedly a favorite of terrorists."

"Nope. This is an AWC Hush Puppy."

"Cute name."

"It's a nine millimeter pistol that shoots subsonic ammo."

"Meaning what?"

"Subsonic ammo is used with silencers. This gun is meant to be used with a suppresser. It even has a slide lock to stop the noise of the next round cycling."

"You're leading up to something, Joe?"

"No, not really. It's just that this is a serious gun. It was developed for the Navy Seals for special operations. You can't buy them at gun shows and you don't find them in pawnshops. It's just not the sort of thing a college student would get his hands on."

"I don't know what it is," said Lottie. "But something really weird is going on."

Danello pulled the clip out of the gun and looked at it. "Right."

# # #

Brian Painchaud woke up twenty minutes later with a splitting headache and in a state of complete disorientation. He

rolled over onto his stomach, then rose to his knees. His vision blurred. He felt the back of his head and found a lump already formed where he'd cracked it on the floor.

The disorientation faded in a few minutes, although the headache didn't. However Painchaud was still mystified as to just what had happened. Like most people who have suffered unconsciousness, the memory of events just before the trauma had disappeared. Brian's last memory was of flipping the safety off the AWC. He eventually concluded that someone else had come up behind him and clubbed him over the head.

Now he felt very sleepy. He had actually suffered a mild concussion, although he did not know this, and he certainly didn't intend to go to the student medical center. Instead he did the best thing he could have done, which was to go home and go to bed.

He staggered to the men's room, wet some paper towels, and held them to the back of his head while he very carefully locked the computer room door. Suzanne was back at her desk in the lobby and waved cheerfully to him as he left. His head throbbed with every step he took and his mouth was starting to hurt also. This confused him even more, since he couldn't remember that he had taken four punches in the face. Still in a fog, he wandered past the Square St. Louis, ignoring the panhandlers along the sidewalk, until he got to his rooms, a small apartment in the student ghetto that surrounded the Prince Arthur Mall. Without undressing, he lay on the couch and went immediately to sleep.

When he awoke he was very frightened.

Painchaud had thrown in his lot with CORE because they were people who could get things done. They weren't like the Puerto Rican FALN, a bunch of losers with homemade bombs, heavily infiltrated by the FBI. These people had *power*. There weren't very many of them, but they knew what they were doing. Wealthy businessmen, highly placed government officials, scientists; they were people with access to *nuclear weapons* for chrissakes. They had dedicated half a decade and

untold millions of dollars to a project that would not only irretrievably change Canada, but the face of the entire globe.

And he, Brian Painchaud, had just blown it out the window.

Borski would probably take it in stride. Borski was cool. St. Vincent was a different matter. He wouldn't kill Painchaud as a punitive action. St. Vincent didn't work that way. But he was determined to keep his secret. If he thought that Painchaud might be arrested, he might have him killed just to make sure he didn't talk.

And of Jean Rais, there was no question. Rais would shoot him in the head without a second's hesitation and consider it a minor security precaution.

In a panic he ran all the way back to the computer lab.

The brisk night air cleared his head and the run helped calm him down. He unlocked the computer room door and sat down in front of a workstation, huffing and letting his heartbeat return to normal. Then he considered his position.

He was not going to be arrested. If he was going to be arrested, he'd have been arrested already. If it had been the police, they'd have arrested him on the spot merely for possession of the pistol.

And the police did not have hackers like that girl.

So the girl was not from a law enforcement agency, but an intelligence agency.

If she was from the domestic intelligence branch of the RCMP, there was no problem. St. Vincent could have that investigation squelched. If she was from the Canadian Internal Security Intelligence Service, he was in a much worse position. CISIS was a very nasty organization to deal with. But CISIS reported to the Solicitor General, and Rais might have enough clout to hinder an investigation. In fact, all they really needed to do was delay it for a few more days. The catch was that Painchaud would have to report the lapse in security to one of them.

On the other hand, what if it was a foreign intelligence agency? They might not be inclined to act at all. He didn't

know how much they had gotten off the Cray, if anything, but even if they had gotten the whole simulation, they wouldn't know what it meant. Painchaud knew that intelligence gathering was only a small part of spying. Data analysis was really the key. He knew that the CIA, the Mossad, the KGB, and MI5 had at one time or another been left flatfooted by major world events, events that they had complete information on, but hadn't known how to interpret. These people had gotten their hands on a climate simulation program. So what? They had no reason to link it to what was happening up there on the ice.

(He completely forgotten that the Cray had been financed by the CORE corporation, and the CORE corporation was doing the drilling on the ice cap.)

Or it might have just been another student. There were hacker organizations out there that broke into computers just for fun. A super Cray in a locked room might have posed a challenge to them. Come to think of it, the girl rather did look like a student.

Painchaud stood up. He made another slow, thorough check of the computer room to verify that nothing was missing. He logged onto the workstation and carefully searched every directory, checking the dates on the files to see if any had been altered recently. Nothing was missing and no files had been corrupted. He ran some anti-virus software and that turned up nothing either. Only the absence of his pistol proved to Painchaud that anyone else had been in that room at all.

Forcing himself to stay calm, Painchaud thought it over and decided to leave town. Michelle's father had a fishing cabin on Lake Peribonca. Michelle wouldn't mind if he borrowed her car. The cabin was empty now, and Painchaud had a key. He would take his books and go up there for a week, without telling anyone. If the police did come looking for him, they wouldn't find him at his apartment.

And by the end of the week, it would all be over.

###

"Joe," said Lottie. "There's something we have to talk about."

"Uh huh," said Danello.

"Our last night in Montreal. In the hotel room. What I did was wrong. I realize that now."

"Lottie . . .."

"It was a moment of weakness, Joe. I let my passions carry me away. I should have stayed cool, should have remained in control of my emotions. But I was stressed out from encountering that kid with the gun and I guess I just needed some physical comfort."

"Lottie, I . . ."

"I enjoyed it, Joe. I'm not denying that. But it's behind me now. It was a one-time fling, nothing more. And the momentary pleasure does not compensate for the fact that what I did would ultimately damage my self esteem."

"Oh, for goodness sake, Lottie! I can't believe you're still going on about that. So what if you ate a whole box of Ben and Jerry's Peace Pops? It's not that big a deal. Vivian goes off her diet all the time."

Lottie gave him a withering look. "Men know nothing about food guilt."

They were standing at the end of the hall, watching coffee trickle out of a Mr. Coffee machine. Lottie had her Garfield coffee mug, and was wiping out the inside with a paper towel. Danello was using a styrofoam cup.

Bainbridge came down the hall, carrying some papers and yellow clasp envelopes. He stopped at the coffee machine and looked into the conference room. "Are we ready to start?"

"They're setting up now," said Lottie. She passed him the coffee pot and he passed her the envelopes.

"Your man Borski is some sort of scientist. He's participated in several international conferences. Here's the files on him."

"Thanks. How is Mac doing?"

"He called yesterday. The judge reprimanded his daughter and her therapist and threw the whole thing out of court."

"Good."

"He's still pretty shook up. I told him to take some time off. He's going fishing in Arkansas. Martha's going to visit her sister there."

"Nice."

"You still think your people are going to blow up the North Pole?"

"God, I hope not. It would ruin Christmas for everyone."

"I think we're ready now." said Danello. "Let's see what they have."

They went into the conference room and shook hands all around. The two men looked similar. They were both thin, had receding hairlines and thick glasses, both wore tweed jackets with slightly frayed button down shirts. Chris Haganbeth was from the National Oceanic and Atmospheric Administration. Eric Lutz was from the Arctic Research Supercomputing Center in Fairbanks. The main difference was in age, Haganbeth looked like what Lutz would be in twenty years. Both did consulting for the DIA with regard to weather prediction, one of the most important variables in planning special operations.

The box on the table was gray and black plastic, with a set of output jacks on the side. Lottie said, "That looks like a Nintendo."

Haganbeth grinned. "It is an Atari, actually. We translated the output files to Atari's virtual reality format. It's kind of crude, but you'll understand the equations better when you see them in graphical form.

Lutz showed her a pair of Atari goggles. "Three dimensional graphics. Very cool."

"That's a VR headset?"

"Yeah." Lutz hand it to her. "You really need it to get the full effect. We left out the sound though. We're just playing the visuals."

He started the machine and Lottie put on the goggles. Lutz put a joystick in front of her, but it was instantly clear that this was not meant to be a game. She found herself looking into a

featureless pale blue void. There was a brief flicker and a set of axis appeared in front of her, thick black poles extending off to infinity, one in each dimension, intersection at the center of her field of vision. By turning her head, she could change the perspective of the poles.

"It should be starting now," Lutz said.

A red dot appeared in the air in front of her. The dot extended into a writhing snakelike line. Trailing a thread of red behind it, it circled the vertical axis, then sank down around the two horizontals. It continued to circle aimlessly, leaving a coil of red loops around the vertical axis. The dot seemed to have no pattern to its movement, looping around apparently at random, but gradually Lottie noticed that the red color was beginning to concentrate in a band about two thirds up the vertical pole. She used the joystick to move in closer and watched it for a while. It meant nothing to her, but apparently Lutz and Haganbeth thought it was important.

She took the headset off and handed it to Bainbridge, then looked at Hagenbeth with a total lack of enthusiasm. "Gosh wow."

"You can actually use the joystick to fly around it," said Haganbeth. "See the trend from any angle you wish. Mathematically, this is a very useful analysis tool."

"Oh boy."

Bainbridge grunted, took off the visor, and passed it to Danello.

"It's a Strange Attractor," said Haganbeth.

"Oh, for Christ's sake," Lottie said with disgust.

"Buzzword alert," said Danello, also unimpressed. He put the visor on.

Haganbeth grinned again. "Now, now. I realize that Chaos Theory is one of the most overworked concepts in science now, but it does have some valid applications and this is one of them."

Bainbridge said, "What?"

"Chaos theory," said Lottie. "The butterfly effect. Systems

that are not random, but are inherently unpredictable anyway. Order out of bullshit."

Chaos theory was the both the bane and breakthrough of weather prediction. On the one hand, it seemed to place inherent limitations on the ability to ever predict the weather more than a few days in advance. On the other hand, it seemed to suggest that weather systems could be modeled with greater accuracy.

"What's this Strange Attractor?" said Bainbridge.

"Strather has a climate model," said Lutz. "It's one of the most complete I've ever seen, also the most complex. You input atmospheric changes and it predicts how the Earth's climate will shift." He paused. "No, that's not exactly right. It won't really solve the equations but it maps the solution in phase space. Mathematically, that map is the Attractor."

"Is it only a map of atmospheric changes?"

"Scripps Oceanographic has one that integrates a statistical atmospheric model with a an ocean general circulation model. This seems to be even more complicated than that."

"Ah."

"We've been trying to model a climate Attractor for years," said Haganbeth. "Everyone in the field has. But dimension gauging indicates that our models aren't complex enough."

"Strather has really jumped ahead of everyone with this," said Lutz. "Provided the predictions prove themselves out. This is a major breathrough. Nobel prize material, in my opinion."

"So this is a weather prediction model?"

"No, no," said Haganbeth. "Climate."

"Climate," said Lutz. "He's looking at long term change in global temperature and precipitation patterns. It's not for predicting next week's snowstorm, no."

"He's apparently tuning the model using the ice cores collected from the GISP and GRIP holes in Greenland. They formed over eons of annual snow falls. The ratio of oxygen-16 to oxygen-18 in the ice indicates the air temperature at the time the snow fell."

"Never mind that," said Bainbridge. "What you're telling me is that this is not something an oil company would use predict the weather for its tankers and drilling rigs, is that right?"

Haganbeth and Lutz looked at each other. "I can't see it," said Lutz.

"It's a very complex program," said Haganbeth. "The data files it's using for input are enormous. This is just a little piece of it here. I can't tell you just what it contains without a lot more study."

"All right," said Bainbridge. "Lottie, may I talk with you a moment?"

They stepped outside and stood around the coffee machine again. "I mentioned this to Mac while we were on the phone. He said there's a man named Murli Naramanchi at the Climate Analysis Center in Camp Springs who's very good at this sort of thing. They have their own supercomputer there."

"All right," Lottie said. "I'm disappointed, but I might as well follow this through."

"I'm not at all disappointed," said Bainbridge. "This is good economic intelligence. A lot of business regulations are being based on these climate models. Fluorocarbons and greenhouse gases and such. This could turn out be very useful. I think it's time to report back to Carlyle."

"We started out looking for uranium oxide."

"Yes. I'm wondering if they're using some sort of isotope tracing to follow ocean currents. That could tie in with this weather thing."

"Yeah, well, it Carlyle is going to issue a finding on that, I'd like to get some sort of confirmation. Can we ask COMIREX to reposition a surveillance satellite?"

"In a word, no."

Keyhole satellites look like the Hubble Space Telescope with the lens pointed down. They are launched in fast, eccentric orbits that allow them to cover most strategic areas several times per day, and can swoop as low as eighty miles to get maximum resolution for their images. But changing their

orientation requires fuel, and the satellites are launched with a fixed amount. Thus, the decision to redeploy a satellite is not undertaken lightly.

"It will be hard to justify a satellite move when we have a man on site."

"He can't get into the rig. I'd like to get some infrared shots and see what they've got inside."

Bainbridge thought for a few minutes, while Lottie waited. Finally he said, "We won't need a satellite. We'll have to pull some strings, but I think I can get you some pictures anyway."

# # #

The *Lisa XP1* was moving across the ice and, in motion, was an exhilarating sight. Great mylar and rubber skirts billowing around her, the huge platform rode on nine giant air cushions inflated by nine electric fans, powered in turn by a diesel generator. Expanding white clouds of ice spicules blasted out from beneath her skirts, and in her wake she left a smoothly swept track of glassy green ice. Across the level ice fields she generally averaged nine kilometers per hour, but when the occasional pressure ridge loomed too high to climb, and too high to go around, the rig would stop, crews would sink a hole in the ice, pump out sea water, and spray it to out to freeze a ramp for her to cross.

The hover-platform was conceived as a pilot design for a semisubmersible, a much larger rig that floated on submerged pontoons, anchored to the sea bottom with stout cables. The semi-submersible, fully contained with housing units, kitchens, flare stack, and helipad, traveled to each ice bound location under its own power. There the fans were turned off and the platform allowed to crash through the ice. Boiling sea water, heated by a small nuclear reactor, would be circulated around the platform to keep the ice from freezing her in. Most of these ideas, however, were still in the development stage, and the more conventional *Lisa* was settled on a thick ice island.

Borski, riding in a heated Sno-Cat with St. Vincent, said, "Who is Lisa?"

St. Vincent shrugged. "Someone's wife, I imagine. There's a great tradition among the independent oilmen of naming things after some chap's wife. Rigs, holes, boats, even Caterpillars. Half the oilfields in the North Sea were proven out by Texans and named after their wives. Except for the Julius field, which was discovered by Ashley Fraser."

"She named it after her husband?"

"She named it after her cat." Under his parka, St. Vincent shrugged again.

The Russian could hardly keep his eyes off the rig. His face filled with awe and admiration. "Nine fan motors," he murmured. "A diesel generator. Three pumps. And they are all running at the same time. When you need parts, you buy them. Just buy them, and fly them in." He shook his head in amazement.

St. Vincent felt his portable phone go off. There was too much noise in the Sno-Cat to actually hear it beep, but the phone had a vibrator on it that he could feel against his waist. He pulled it out from beneath his parka. "St. Vincent here."

"We need to talk. Privately." It was Jean Rais.

"Give me ten minutes." St. Vincent knew not to use names when the talk was private.

"Right." Rais hung up. St. Vincent tapped Borski on the shoulder, pointed at the communications trailer, now being towed by another Sno-Cat. Borski nodded. St. Vincent pulled on his gloves and hood — bare skin could freeze in minutes in the Arctic — and hopped out of the moving tractor. He walked quickly to the moving comm trailer, grabbed the door handle, and pulled himself in. The operator greeted him.

"Hello, Andrew. I am expecting a private call in just a few minutes."

"Yes, sir." Andrew reached behind his desk and pulled out a black plastic attaché case. He handed it across the desk to St. Vincent. "You can use any one of the offices. Just plug it into the phone jack."

"Thank you, Andrew."

The trailer had two small offices that were used for making personal phone calls. St. Vincent set the case on the desk and opened it to reveal a telephone scrambling system. It was an old one, built in the 70s, before Clipper chips, equipped with a touch-tone pad, a selection of modular phone jacks to suit most of the international systems, plus an acoustic coupler. He pulled the modular phone line from the case and plugged it into a jack in the trailer wall. The scrambler was equipped with its own tape recorder. This he ignored. He waited.

Jean Rais was at a public phone in the underground mall beneath Place Bonadventure, with a briefcase similar to St. Vincent's. He put the handset of the public phone into the acoustic coupler and dialed a long distance number, prefixing it with an international access code and the ocean area code for placing a MARISAT call to a vessel at sea. Through regular long distance lines the call connected with COMSAT's coast earth station in Sudbury, Connecticut, was transmitted to an Inmarsat satellite, and relayed to CORE's Arctic receiver. Whereupon St. Vincent's phone gave a perfectly ordinary ring. He picked it up.

"Ready?"

"Yes."

"Go ahead."

St. Vincent pushed the talk switch to scramble and punched in that day's password. The passwords were seven digit telephone numbers, taken randomly from the Montreal telephone directory. A red LED indicated that his words were now being scrambled, although he could hear no difference.

"I'm afraid we may have a security breach," said Rais. "The young man running our computer simulations disappeared."

"Oh dear." This was not good news. Despite his youth, Painchaud knew almost everything about the operation, nearly as much as Borski and St. Vincent. He had to, in order to run the simulations. "Well, he always was rather a weak link in the chain."

"He is a hosehead," agreed Rais. "But his girlfriend is

worried about him. She talked to the police, but he hasn't been gone long enough for her to file a missing persons report. I can have that squelched, if need be."

"Is anything missing from the computer room?"

"God only knows. I can't tell. There's no sign of forced entry."

"Well, do we even have a problem? We are fairly well finished with the simulation end of it. Perhaps he's just off on a holiday. Or he's found a new girlfriend."

"Brian?"

"Er, perhaps not."

"No, not Brian. He wanted to be right on top of things for the end. He packed a few things and left suddenly and also . . ." Rais paused. "His pistol is missing."

"His pistol?"

"He kept a pistol in his desk at the University."

"Where on God's earth would Brian get a firearm?"

There was a much longer pause. "I gave it to him, actually."

"I see."

"It was necessary to get him into the group, Michael. To help maintain his commitment. He wanted to be a terrorist, you see. We had to maintain an aura of danger."

"This is very disturbing. Brian is not the calmest of people. I do not want him popping off and killing some innocent policeman."

"He won't," Rais promised. "We'll find him before they do."

"I'm holding you responsible for this, Jean."

"As well you should. If he stays in French Canada, and I think he will, we will not have any problem. If he tries to leave the country, our options are much more limited. He is armed, however, and I think we have to consider him expendable at this point."

He heard nothing but silence for long moments. Then St. Vincent said, "Do as you think best, Jean."

The connection was broken and St. Vincent returned to the Sno-Cat. He pulled his gloves off and blew on his hands.

Condensation was dripping down the tractor's windows. Across the ice, the wind whipped clouds of smoke and vapor around the slowly moving *Lisa*. Borski pointed to it and smiled. "So much planning and creativity. All now all for nothing, eh?"

St. Vincent was lost in thought and did not reply.

# # #

Captain Thompsen was irritated, although it did not show. At least, it was not apparent to Lian Takanasha, for whom Edward Thompsen always appeared to show the same level of irritation. His crew, however, had learned to notice the subtle differences in attitude, but they were no happier than Thompsen was. "All right," he told them. "We've all seen the results. Staring at the bloody thing isn't going to change them."

Shelly had the conn, and nearly all the other ratings were now on the engineering deck, looking at the output from a condensate analyzer. The instrument took fourteen minutes to cycle through its analysis, and every fourteen minutes it would show that the sodium level in the condensate had increased. As had the chloride level, the magnesium level, and the iron level.

"Sea water contamination," said Davis, for Takanasha's benefit. Takanasha knew it already.

All steam powered ships share a common weak point and that is their condensers. Whether the ships are ultimately fueled by coal, fuel oil, methane gas, or nuclear power, in all cases the fuel is used to boil water to generate steam. At high temperatures, the minerals in the water will precipitate out on the boiler tubes and cause damaging hot spots, so the water has to be very pure. In fact, the hotter the steam, the more pure the water has to be.

Because purifying water is a tedious and tricky business, the ships condense the steam after the usable energy has been extracted from it, and re-use the already pure water. The steam is condensed in large heat exchangers that are cooled by sea water. Sea water is very corrosive and these condensers are prone to develop leaks. The leaks allow sea water to contaminate the pure condensate. Small amounts of sea water

can be removed by the ship's water purification systems, but if the leaks are severe, the purification system will be overwhelmed. The contaminated steam will cause disastrous failures of the boilers, the engines, or both.

Ultra pure water is sometimes referred to as "hungry water" because of its tendency to dissolve metals. Sea water, with its high chloride content, will leach the zinc out of brass, and induce stress cracks in stainless steel. So the ship's condensers, with ultra-pure water on one side, sea water on the other, faced a double whammy. In addition the high operating pressures, and a multitude of tubes, baffles, welds, and joins, offer plenty of places for leaks to develop.

So when the Aldershot's condensate analyzers reported higher than normal chloride levels in the condensate, neither the officers, nor the Captain, nor Takanasha was the least bit surprised.

"Except that those condensers are bloody damn new," complained Thompsen. "I expected a bit more life out of them than this."

Takanasha said nothing. The remark was aimed at the engineering officers, yet as the sole representative of Ishikawajima-Harima, he could not help feeling a sense of responsibility for the leak. The engineering officers, on the other hand, were taking this in stride. As far as they were concerned, there was no point in speculating until the offending tube or tubes had been removed and subjected to failure analysis. For now, they would just have to be found and plugged.

"As long as we're going to be mucking about in there, might as well make a right job of it," said Thompsen. "Go to minimum forward speed and inspect the whole lot."

Thompsen was prone to be cautious where boilers were concerned. Earlier in his career he had had command of the Bexhill, a one half million ton supertanker, when she was making her way around the Cape of Good Hope. The Bexhill had only one screw and one boiler, and salt water had fouled

the reverse osmosis membranes in the water purification system. With the boiler on the brink of failure, Thompsen had been forced to radio for a tugboat.

It had been an expensive decision. Thompsen's crew had managed to restart the engine and limp into port under their own power, but under certain conditions merely a call for aid can render a ship and its cargo subject to salvage law. P&O had reached a negotiated settlement with the tugboat company, but it had been expensive. Although a board of inquiry validated his decision, Thompsen took it as a blow to his professional pride. He was determined now to keep his boilers at peak operating condition.

This meant that one boiler would be shut down and the Aldershot would slow to four knots, the minimum speed she could maintain and still keep her ability to maneuver. Running on one screw added a certain instability to maneuvering, but the manipulations were well within the ability of the boat's guidance computers. They were still over the Mendeleyev Plain, with three thousand feet of water separating them from the flattest region on Earth. It was unlikely that any surprises would come from there. With a boiler down the condensers could be taken off line, opened up, and inspected. This was a good practice for a new vessel, for the condensers were not infrequently found to cluttered with debris left from construction.

Takanasha found himself suddenly appreciative of the fact that P&O had spent the extra money for a twin engine system. A year before, he had visited his brother in San Francisco. They had ridden the BART subway from San Francisco to Oakland, a trip that took them through a tunnel beneath San Francisco harbor. Mysteriously, the train had stopped for a few minutes in the middle of the tunnel.

"Try not to remember that you are under four hundred feet of water," his cousin advised. Takanasha had tried not remember that, but failed. He reflected that now, if the Aldershot lost power, it would again be exceedingly difficult not

to remember where they were.

Thompsen's crew complied with his orders and the Aldershot slowly reduced speed. The delay would add another day to the boat's voyage. It also meant the Aldershot would spend another day under the ice.

# # #

It was late evening at Beale Air Force Base in California, but Dan Washington had set his watch, strapped to the outside of his orange pressure suit, to Greenwich mean time, the zone where his mission profile called for a rendezvous. Under the plane, two crew members were detaching the hoses that filled the SR-86's tanks with liquid methane, the supercold fuel that made up two thirds of the aircraft's mass. Behind him, the ground crew was giving Dave Tolliver, the Reconnaissance Systems Officer, a final check of his pressure suit, before helping him into the flat black, triangular aircraft. Washington watched him and groaned inwardly, as he always did when he was scheduled to fly a mission with Tolley.

He slipped into the cockpit and spent some time adjusting the seat and shoulder straps. He would be in this plane for the next six and a half hours, and he considered that a few minutes now making sure he was comfortable was time well spent. After settling in, he switched on the radio.

Tolley was already talking into it. "So Jenny went to pick her up after the dance and she wasn't wearing her retainer. Hell, she hadn't worn it all evening. I told her she was grounded for a week. Jenny thinks I'm being too hard on her, but, my God, after the money we spent on those braces, I'll be damned if I'm going to see her teeth grow crooked again." Tolley would continue talking for the next six and a half hours. He would continue talking after that, of course, but at least Washington wouldn't have to hear him. He wondered how the man's wife and kids could stand it. Outside, the hanger doors slid back, and guards with M16s scrambled aside. The ground crew kicked the chocks out from in front of the wheels and the Aircraft Towing Vehicle pulled the SR-86 Aurora out onto the

runway.

Washington tapped a function key on the large-format video display in front of him, and heat shield slid back from the tiny retractable windscreen. He glanced through it only momentarily. The windscreen was too sharply angled to show much anyway and he preferred to fly off his system displays. The Aurora's cockpit had no throttle or control gear. It took off, flew, and landed by a programmable auto pilot. Washington considered himself more of a flight manager than a pilot.

"Cleared for take-off, Tolley," he interrupted.

"Okay," said the RSO absently. He was busy with his own systems displays, the multi-million dollar battery of sensors that made the spy plane an unmatchable reconnaissance tool. "I told her, Stacy, you're thirteen years old. You've got to start showing us you can behave responsibly. If we can't trust you to do something as simple as wearing your retainer, how will we be able to trust you in few years when you start dating?" Washington knew from past missions that Tolley's constant chatter did not detract in the least from his concentration. Sometimes he suspected that the RSO didn't even know he was talking.

He looked out the windshield again and saw that the runway was clear, as he knew it would be. The hypersonic aircraft was still top secret and the soldiers assigned to the 9th Strategic Reconnaissance Wing kept all non-mission personnel as far away as possible. He tapped in the commands that started the takeoff sequence. The aircraft started forward as the turbine compressors spun up, delivering air to the combined cycle ramjet engine and accelerating it very quickly. There was a low pitched, but high volume *boomboomboom* sound as the fuel injectors dumped liquid oxygen into the flowing methane stream. Then the nose lifted off the ground and the plane took off. The sonic boom shook the ground as it headed skyward at a seventy degree angle.

Washington watched his course lay itself out on the systems display. The skin temperature quickly reached a thousand

degrees, then leveled off as the liquid methane flow cooled the plane's airframe. He quickly ran through the series of screen displays, checking the outside temperature, the developing weather patterns over the target and refueling areas, and the displays for the craft's mechanical and electronic systems. When the altimeter showed sixty thousand feet he said, "Cutting out the LOX, Tolley."

The RSO paused his monologue long enough to acknowledge the comment. The SR-86, already moving at Mach 2, was now running as a pure ramjet, and gaining both speed and altitude. At Mach 6 and twenty miles above the ground, it swung out over the Pacific and headed for the Bering Strait.

At the same time, a heavily loaded KC-135Q lifted off into thick fog from its base in Scotland. It carried more methane, and its tanks were heavily insulated to keep the liquid cold. It headed for its rendezvous point one hundred miles east of Faroe Island, Denmark. Climbing into the clear morning air, it met a pair of F-15 Eagles assigned to escort it. The three planes settled into formation, the two fighters following the tanker over the open sea.

Tolley's voice had taken on a preoccupied tone. "Sure, I can understand that she doesn't want to wear the retainer in front of her friends. But that's the whole point. She shouldn't let herself be influenced by what her friends think." He was running the cameras through their checks, selecting images and optimizing them on a high resolution screen. Since the U2 incident in 1960, a Russian-American agreement prevented spy planes from overflying Soviet airspace. There was little the CIS could do to stop the SR-86 — it flew too high and too fast for even the SA-12 and SA-10 SAM missiles — but the agreement was adhered to as much as practical. The spy plane's sideways looking sensors allowed Tolley to conduct surveillance from well outside Commonwealth airspace. And there was nothing contradictory about maintaining surveillance on a now friendly nation. Today's friends could become tomorrow's enemies and the best way to avoid conflict was to be prepared for it.

"What with all the drugs out there, it's important that she should learn to resist peer pressure."

"Uh huh," said Washington.

Today's mission contained something out of the ordinary. He and Tolley were supposed to make a sweep around the northern edge of Siberia, with special emphasis on the industrial port of Murmansk and the submarine building pens at Polyarny. But instead of skirting the coast west of the Chukchi Peninsula, they swung north of Wrangel Island, where a solitary drill rig was located, crossing the ice on the edge of the continental shelf.

Tolley got to work. Since it was a clear day, the Synthetic Aperture Radar, which could compile photographic quality images through smoke and cloud cover, was not needed. That was good. Although the SAR could distinguish cars and trucks from one hundred miles away, enemy radar could easily detect its presence. It was difficult to keep an SAR scan secret.

Instead an infared camera scanned the rig at 122 different wavelengths, through a forty-eight inch telephoto lens. The images were stored on disk, then transmitted in near real time through a phased array antenna at the rear of the plane. NSA satellites picked up the transmissions and retransmitted them to the Pentagon.

"I'm not picking up any electronics," said Washington. "No radar, no nothing."

"Me neither," said Tolley. "They don't even know we're here."

"Then let's overfly 'em." Washington programmed in the course change. A direct overflight, especially in the morning when the light was even and shadows were long, gave the best images.

At Aurora's hypersonic speed, an overflight did not take long. "Got it," said Tolley, looking at the images on his screen. "First pass complete."

"Let's do it again." Washington brought the plane around in a wide figure eight. It was best for spy planes to make two

passes, if possible, at the same altitude but at slightly different courses. Photos from each pass could be combined to form stereoscopic images that heightened detail. Washington waited until he was over the horizon before making the turn. He didn't think anyone on the rig could see them, or even knew to look, but it was a standard security procedure to avoid letting your plane's profile be seen.

"Second pass complete," said Tolley. He was already composing images and selecting them for transmission.

"Right," said Washington. "Let's move on to the next one."

There were a few golden minutes of silence while Tolley tapped rapidly into his console. Then he started again. "Of course, Alice, she's only nine, but she'll be ready for braces in a few years too. Although I don't know. Now they're saying to wait until the kids are older, like in their late teens these days, especially the girls. Let them build up their self-esteem first."

Washington gritted his teeth.

# # #

"Take a gallon of molasses," the heavy set man said. "Stir it into a yard of sand. Freeze it to fifty degrees below zero. Then try to get it back out. And that's the Athabasca tar sands."

"Yes," said Borski. He was tired. He had flown over Fort McMurray that morning, on his way to this meeting, and seen the Athabasca tar sands region. It was huge. The sands might be covered by anywhere from two inches to two thousand feet of overburden, so no one really knew how far they extended. Some estimates put them as much as twenty percent of Alberta. Even from the air you couldn't grasp how vast that was. Thirty thousand square miles of gently rolling hills and deep banked rivers, marked with lakes and covered with scrub forest of pine, spruce, and poplar.

The heavy set man was Rafael Lafou, one of CORE's board of directors. He had come for the latest progress report from St. Vincent. Most of the other directors were there also, meeting quietly in one of the cottages at the back of the Chateau Bonne Entente. "Three hundred billion barrels of oil,"

he said. "Locked away in those sands. Three hundred billion! The largest single oil deposit in the world. Just think of it. Hell, all of Prudhoe bay only holds ten billion."

Borski nodded and took a deviled egg from a tray on the table. He knew he had to be especially polite today. These were the wealthiest backers of the project, and of the Quebecois separatists. They were Canadian businessmen who stood to make fortunes from the new reshaped Canada, or politicians who would advance their own ends in the Canada that was an economic powerhouse.

"It will have to be strip-mined of course, but that's all right. We'll put the tailings back in the hole and reforest over it. Of course, we can log the trees out before we open up the ground."

"Of course," Borski agreed. "I would like to hear more about this woman."

Lafou shrugged. "There is little to tell. Rais's people interviewed the receptionist and the University. She said a man and a woman came in looking for Strather. She send them to Painchaud instead. A little later Painchaud left."

"He left with them?"

"She didn't see them leave. Painchaud left alone."

"Why is he hiding from us?"

"He's a student. Maybe he wanted someplace quiet to study." Lafou did not say that Painchaud had been located.

Borski was not satisfied. "Have you been able to identify the woman?"

"No," said Lafou, reluctantly. "Probably just another student trying to do a little hacking. Even if she got in, there is nothing on that computer that would mean anything to anyone else but us."

"Then why was Painchaud given a gun?"

Jean Rais came over and took Borski by the arm. "Please excuse us, Rafael," he told the heavy set man. To Borski he said, "We have some people with questions about the fishing situation."

Borski went with him, looking back at Lafou. Rais introduced him to more men, both in their sixties, with weather- beaten faces and hard, gnarled hands. One, who introduced himself as Simon, shook Borski's hand and said, "Good to meet you, Anton. Denis here is concerned about the affect of the water temperature on the fishing."

Borski nodded. "I suspect then, that you have fishing interests?"

Denis said, "Simon thinks we should start buying up fishing boats. Fishing has been declining for the past decade, so prices are good. He talks about this quite a lot, too. You can't imagine how frightfully tedious he can be."

Simon just smiled and said, "Denis has his eye on a frozen food plant or two that he seems to be inordinantly proud of. Also a cannery, eh? He does rather go on about them."

"You may rest assured, gentlemen, that the fishing will be better than ever. In fact, we expect the increased food production from fishing to justify this project, even of itself."

Simon and Denis exchanged looks. Denis spoke first. "Right. Now my understanding is that there are more fish in the Arctic region than in the temperate regions because the water is colder. Cold water absorbs more carbon dioxide, which the algae need to grow. Then the algae feed the krill, and the krill feed the fish."

"No," said Borski. "That is a popular misunderstanding but it is not correct. There is very little life in the polar Arctic Ocean. Growth takes place faster in warmer water, regardless of the carbon dioxide level. Most of the intense fishing is on the boundary areas, where the Arctic waters are penetrated by the Gulf Stream or the Japanese Current.

"It is the same thing in the Anarctic, which is three times more productive than the north. The warm currents meet the cold water and cause convection type upwellings, that bring up nutrients from the bottom. So there is much more sea life there and the fishing is better."

Denis nodded, satisfied with the explanation. Borski pulled

Rais away. "This woman was an American spy."

"There is no reason to think so."

"I know it. We will have to accelerate our timetable."

"I've already discussed it with St. Vincent. We can get you more men, that is no problem. But there is a limit to what we can do with equipment. The delivery times are just too long to get you anything worthwhile."

"Have we had any reaction from the Americans?"

"No. Nothing so far. Even if she was an American spy, would she even know what she was looking at?. It takes quite a while to analyze data like that. They might not have given it a high priority."

Only Borski's fatigue kept him from snapping back his answer. "Of course they will give it a high priority. Russians and hydrogen bombs in their back yard. They will not stand for it!" He had already decided that the Americans had spies at the University, and possibly within the CORE corporation. Only the slow grind of bureaucratic inertia had prevented them from acting so far.

He said, "We must discuss the warning."

"We're working on it," Rais said easily.

Borski had forced an agreement from St. Vincent at the very start of the project. He did not want to see innocent people injured. There must be a world-wide warning broadcast, he insisted, in a variety of languages and a broad spread of wavelengths, before the explosions were initiated. "We must be prepared to release it as soon as the explosives are in place."

"We don't want to go too soon," said Rais. "That will give them time to stop us."

"We have little choice. Once the bombs are in place, they can do nothing to stop us anyway. Not in a short time. We must tell them. Not too soon, but not too late either. There are Arctic scientific expeditions up there. There is plenty of shipping that will be affected. There are fishing boats right on the edge of the ice pack and they must be given time to get clear. Some of them can only travel ten or twelve kilometers per hour. Also

there are submarines beneath the ice pack." He looked to where St. Vincent, on the other side of the room, was talking to another director. St. Vincent saw his glance and nodded to him.

"There are no Arctic expeditions in progress now," said Rais. "The weather stations are all remotely monitored these days. The pack has frozen and the fishing boats on the edge will not be harmed by the explosions in the high Arctic. The Northwest Passage has frozen and there is no shipping that will be affected, nor will the great circle air traffic over the poles."

"And the submarines?"

"Well, the diesels don't go under the pack, so that just leaves the nukes. Most countries are keeping them home these days."

"We can't count on that."

"Yes, well, we realize that. We are, or course, preparing a general broadcast to the government, and on the naval frequencies, for each country that runs submarines in the Arctic ocean," said Rais. "There will be plenty of time."

Rais was lying.

The announcement had been hotly debated among the CORE group project managers. They were not happy with the agreement. The project had cost several fortunes. It would bankrupt the corporation, and more than a few others, if it failed.

The directors looked at the number of special action, quick response military forces that various countries, not least of all the United States, had developed. An armed force could be put in place very quickly, and CORE was not prepared to fight a war. Eventually, they had decided that too much was at risk to worry about the fate of a few subs and fishing boats.

St. Vincent agreed. There would be no warning.

# # #

Three cubelike buildings next to the Washington Naval Yard comprise the National Photographic Interpretation Center. The windows are tinted brown so that outsiders cannot see in, and triple rows of barbed wire top the surrounding fence. From the

inside, though, it looked like any other office building. To Lottie, there was only one factor that made it immediately different, and that was the magnifying glasses. Every desk and table was covered with photographs, with two or three magnifying glasses holding down the stacks, and virtually every employee had one shoved into a pocket somewhere. Most of the NPIC's staff was devoted to high altitude reconnaissance. Lottie wondered who had the lens concession.

She was sitting in a briefing room that had a slide projector and no windows. A man named Don Powers was arranging the slides. There was little enough he had to tell her, but he had prepared a short presentation anyway.

Powers had worked for Arco Oil and Gas for sixteen years. He was just back from Hainan Island in the South China Sea, where AOAG had two production platforms offshore. Typhoon season was still in full swing, and South China typhoons come up fast and intense. The rigs had already been evacuated four times this year. He had scheduled two days in Washington to do the analysis, before returning to the Arco offices in Anchorage. Powers had never heard of the Office of Economic Intelligence, but he was not surprised to learn about it. Everyone knew that non-military intelligence was a growing field.

The only other person in the room was Murli Naramanchi, Macpherson's friend from NOAA. He was thin and dark skinned, had very dark eyes set deep in his face. He was very quiet and had hardly spoken to Lottie at all, seemingly lost in thought.

Powers dimmed the lights with the remote control and cleared his throat.

"This is an overview of the drilling camp," he said, pointing to the first slide with a laser pointer. "Note the deeper color of the ice around the drill camp. When drilling in deep Arctic water, a hole is first cut in the ice, and water is pumped out and sprayed over the pack surface. It freezes, of course, a layer of gravel is laid down, and them more water is sprayed on top. This is continued until a stable platform twenty feet thick is

created on which to install the rig.

False color imaging had been used to bring out the details on the slide. The structures looked normal, but the bright colors reminded Lottie of old Peter Max posters from the sixties. The humans showed up as bright dots of red, very clear against the cold blue background of ice. Even their footsteps left a heat signature.

"At the same time a second platform is created three hundred feet away to drill a relief hole in case of a blowout." He waited while Lottie looked over the slide.

"I don't make out the second platform," she said.

"Nor do I. There is no second platform. Lets take a closer look at the rig."

The drilling platform was enclosed to protect it from the weather, but the infrared cameras could penetrate the housing. Aluminum and foam panels fogged out a lot of the detail, but Powers seemed to know what he was looking at.

"No blowout preventer, but your man already reported that. Russians often drill without blowout preventers, but Canadians don't. So this seems to confirm his report that they are not actually drilling for oil."

"He said they were planting seismic charges.

Powers paused thoughtfully. "Possible. Nowadays we use compressed air imploders to generate bangs. Less dangerous. But if they're using Russian technology, well, who knows. I suppose they might still use explosives. Certainly the Russians have done a lot of mapping of the Arctic."

"Nuclear seismic charges?"

"A bit of overkill, I would think. Seismic charges only use a few pounds of explosive." Powers noticed that Naramanchi was watching him extremely closely when he said this.

He flipped to the next slide. "Not much pipe in the racks, either, so they can't drill much of a hole. Note that none of the men coming out of the rig appear to be muddy, that is, there's no indication that they're using drilling fluid."

New slide.

"They drilled through the ice, but now they've got the drilling table pulled away from the hole. Very wide casing, a lot wider than you need to put slimhole pipe down. And there seems to be a lot of welding going on. I think they're building some sort of structure and shoving it down the hole."

"So they're building something under the ice?"

"They could be lowering a diving bell or a submersible craft. We're possibly looking at some sort of sub-sea platform installation, like Saga Petroleum's Tordis field in the North Sea. The wellheads and controls are actually placed on the sea bed, connected by underwater pipelines to the production platform. You fabricate them above ground, set them into welded tubular frames, and lower them on cables to the ocean floor."

"But you still have to drill the hole?"

"Right." Powers put the pointer down, spun a chair around, and straddled it cowboy style. "There's a hell of a lot of oil in the Arctic. Well, we *think* there's a hell of a lot of — let me put it this way. The three most important world oil reserves have been found in intercontinental areas that were occupied in geologic times by mediterranean seas. Thoses are the areas bordering the U.S. Gulf Coast, the Caribbean, and the Middle East area bordering the Persian Gulf.

"The Arctic Ocean is the fourth such area.

And then saying that, Powers got a strange look on his face, a hungry look, an almost lustful look. It was a look that Lottie had seen before, the look that certain women got in front of a Cartier display case, that miners got when sinking a shaft, that oilmen got when spudding a well. It was a look that said *gold fever*.

"Furthermore the geological structures are extremely favorable. The source rocks known to be capable of generating oil are known to be present. The reservoir rocks capable of containing oil are known to be present. The caprock structures known to trap oil are present. Some of these structures are a hundred miles long and a thousand feet thick, with very permeable Cenomanian reservoirs."

"Cenomanian," murmured Lottie, taking notes.

"The middle Cretaceous period," said Naramanchi.

"Thank you. Okay but, as I said, you still have to drill the hole."

"Yep," said Powers. The look disappeared "That's the problem, all right. You can't drill it from on top of a moving ice pack. Half a dozen years ago the Russians moved in one of their Shelf class semi-submersible platforms when the pack broke up and didn't get it out in time. So they kept drilling from it after the pack froze back up." Once again Powers noted that Naramanchi was watching him very intently. "Anyway, it was a disaster for them. The ice totally destroyed the rig. The well had a major league blowout. Killed a whole bunch of people. They haven't been back since."

"Is there any way to drill a hole under the ice? A submarine drilling rig, maybe?"

"Well, certainly these things have been talked about. But that kind of technology would be enormously expensive to develop. The CIS doesn't have that kind of money anymore."

"But what about the Canadians?"

Powers tilted his head and thought. "No. Listen, it doesn't matter who's doing it. The Cold War is over. Anyone with subsea development technology isn't going to keep it a secret. They're going to be on every street corner collaring investors and screaming about how great it is."

Lottie sighed. "All right. This is getting off the subject anyway. I was looking for some connection with nuclear weapons, but it looks as though I'm not going to find it here."

"Yes, you are," said Naramanchi.

They both looked at him. It was only his second comment, and now he was stirring sugar into a styrofoam cup of coffee. He tasted it and looked up at them. "That is exactly what they are doing. May we switch back to the previous slide, please."

Powers found the reverse switch on the slide projector control and flipped one back. It showed stands of pipe in a drill rack alongside the rig.

"Do you recognize this man in the lower corner?"

"No," said Lottie.

"I don't," said Powers.

Naramanchi was looking at some notes. "You have associated a man with this project. A man named Anton Borski. Yes?"

"Yes."

"Ah. Then you know who he is?"

"Not really," said Lottie. "He's not in our databases, so he's not part of their intelligence community. He's not part of their political structure either. He's an academician who served on some international committees. We don't know what he's doing here and they don't seem to know either. Their best guess is that he got in with some sort of black market operation involved with the transportation of equipment from Canada to Russia."

"I'm doubt that very much," said Naramanchi. "Anton Borski is a meteorologist who is rather well know, at least to those of us in the field. He was assigned at one time to the Arctic and Anarctic Scientific Unit of St. Petersburg, which was Leningrad at that time. He is one of the men responsible for the Angara River irrigation project."

"So why is he at a Canadian drill camp at the North Pole?"

"The Angara and Pechara rivers in Northern Siberia," continued Naramanchi, as if he hadn't heard, "deposit a very large amount of fresh water into the Arctic Ocean. Together they have an output about one fifth the size of the Congo. Now fresh water is much less dense than salt water, so it tends to stay on the top. And of course it freezes more easily and thus contributes to the formation of the polar ice cap."

"Oh yeah," said Powers. "Right. I heard about this."

"Ostensibly the purpose of reversing the flow of the Siberian rivers was to bring water to Uzbekistan and the other Central Asian republics. But some scientists suggested that by diverting fresh water from the Arctic Sea, the Russians wanted to trigger a global climate change that would bring warm

weather to Siberia."

"Is that really possible?"

"Nope," said Powers. "The Canadians thought of the same thing. I heard about this when I was at Prudhoe Bay. They found the rivers were actually bringing warmth into the Arctic."

"In 1958." Naramanchi had taught college classes back in his graduate school days, and had determined that the best way to handle interruptions was to steamroller right over them. "In 1958 the head of the National Weather Service was Doctor Harry Wexler. Doctor Wexler calculated that as few as ten hydrogen bombs, properly detonated under the ice, could trigger a global warming trend and result in the melting of the polar ice cap."

There was a long moment of silence.

Lottie finally spoke.

"That," she said, "is really stupid."

# # #

Although Tomas D'Asassi's suit was well made and sharply cut, it was of tropical weight wool, designed for the warm and humid temperatures of Brazil, where Curitiba Technology had its headquarters. Whereas the offices of P&O shipping overlooked Ireland's Bantry Bay. They were housed in a modern building, of glass and steel, and concrete shaped to look like stone, and the building was heated of course. But the British, whose idea of comfort was to huddle around a gas jet in an old thatch cottage, just never seemed to have gotten the hang of central heating. Or so thought D'Asassi. Across his ancient oak desk, Fred Mallory was wearing a beefy tweed suit over a thick cardigan sweater.

"Tommy, I don't see what the problem is," Mallory was saying. "Degradation of waste oil and hydrocarbons. That's what they were designed for, that's what we buy them for, that's what we use them for."

D'Asassi loved visiting Bantry Bay. Gulf had built it as an oil transit port, where crude was transferred from VLCCs to hundred thousand ton tankers enroute to Denmark, or Holland,

or Spain. It was also one of the most beautiful places in Ireland. Very Large Crude Carriers could only put into very deepwater ports and in Europe, deep water often came with spectacular scenery. The bays of Ireland, the lochs of Scotland, and the fjords of Norway, where grand cliffs provided shelter for the biggest ships afloat.

Including P&O tankers. Mallory was being deliberately obtuse, D'Asassi knew. But P&O was a very good customer and he did not want to offend them. He had been cultivating this account for several years. And he knew that Mallory knew that also. Still, there were some issues that could not be avoided. He waited while the purchasing officer adjusted some of the papers on his desk.

"Fred, this nanomachinery was designed to be used in enclosed containers. Put it into a sludge tank, let it degrade the long chain organics, deactivate it with heat if you need to. But you can't let it get away from you."

Nanomachinery could get away from you. Because nanites are so small and so complex, and because so many of them are required, there are only two ways to construct the necessary amount. Curitiba used both. The first is to have the nanites built by other nanites. The construction nanites are called assemblers.

But to build billions of nanites requires billions of assemblers. To construct billions of assemblers requires an inordinate amount of time. So the assemblers are designed to be self-reproducing.

A single assembler is painstakingly constructed, then released into a tank filled with a chemical solution. The solution contains all the elements needed for the assembler to build a copy of itself. This might take as little as twenty minutes, or as long as thirty-six hours for a complex assembler.

If a single assembler replicates itself in twenty minutes, that means there will be eight of them in one hour. In two hours there will be sixty-four. In ten hours there will be a billion. When a preprogrammed amount of time has gone by,

the assemblers stop replicating themselves and start building the nanites that are needed to perform a commercial chemical operation, such as constructing a complex polymer.

The second method is to combine the two types. The nanites that perform the chemical operation also assemble more nanites. This is ideal in a situation where the nanites are used to degrade hazardous waste. Since the nanites themselves use part of the degraded waste as construction material for more nanites, overall reaction efficiency is very high. And since the bulk of the nanites are assembled on site, the costs and safety considerations associated with their transport are reduced.

"Now we have some designs that are meant to be released into the open. Models that will clean up toxic waste dumps, for example. These types are self-deactivating, and will not reproduce. But we have not yet succeeded in getting them approved for use here. Or the European Common Market, for that matter. Or America. In fact, not a single country has approved their release in unconfined conditions as of this date."

"Hmmm. What about international waters?"

"I wouldn't . . ."

"I ask merely out of curiosity, of course. P&O maintains its concern for the environment wherever its ships are located."

D'Assasi paused to collect his thoughts. "I appreciate that, Fred. But that is beside the point. All the nanites we sold you for cleaning sludge tanks are the reproducing kind. They're intended to break the carbon-carbon bonds among hydrocarbon atoms, but in fact that means they'll degrade pretty much any organic matter. So once they're released, even if the spill was in international waters, the potential for — liability — will be quite high."

Mallory picked up his telephone. "Dolly, bring us in some more tea, will you? Thank you." He regarded Tomas with amused tolerance. "I'm not quite sure why we need to review this, Tommy. We've had no problems with your products and I assure you we are quite aware of our responsibility in these matters."

D'Asassi had reached the most uncomfortable part of what was ostensibly a routine sales call. "We have information —we believe it is accurate — that P&O has a contingency plan to release nanites into the ocean in the event of an uncontrolled oil spill."

Mallory bland smile was frozen in place. "Do you now?"

"We believe this is accurate," Tomas repeated.

Mallory's secretary came in with two mugs of tea and packets of sugar and instant creamer. Mallory considered himself a practical man who was too busy to fuss with tea service and hot milk. He dumped two packets of sugar into his mug and stirred it.

"I'm afraid you've been misinformed, Tommy. In fact, we did discuss the use of nanites to control oil spills, and a very nice piece of business it will be for you when we start using them. But when we do, we will certainly use only the products you recommend for that purpose. And naturally, until you come up with a product that has been approved by the British government, well, we wouldn't dream of releasing them in the open sea."

"I'm very glad to hear that, Fred."

"I'm glad I could set your mind at ease."

D'Asassi, however, was not a pushover. Curitiba had spent a lot of time and a lot of money working to get open environment nanomachinery approved. The regulatory doors were just beginning to open, and Curitiba was not about to see them slam shut again because one customer misused the technology. "There's just one more thing, Fred. Because of the tremendous liability involved, I'd like to do an inventory of all our products in your stock. To see if they match up with known rates of usage. I'm sure everything will check out fine, but this is just to set our legal department's mind at rest also."

Nanites that were added to hazardous waste were then considered part of the waste, and British regulations required a Letter of Transfer of Possession before they could be ultimately disposed of. D'Asassi was certain he could track down any

missing shipments without much trouble.

Mallory had a momentary look of uncertainty, then he smiled again. "I see no problem with that, Tommy. How long will you need?"

"Less than a day."

"Next Monday?"

"Fine."

"Lunch afterward? How about at my club?"

A red light bulb flashed in D'Asassi's head. It was an unwritten law of business that the salesman offered to buy lunch, not the customer. D'Asassi hid his suspicion. "That would be very nice. Thank you."

"I'll have Dolly set it up." Mallory reached for the phone again.

# # #

"For God's sake, Fred, how could you let this happen?" Malcom Lowry was exasperated. "As if the damn Greens don't give us enough trouble over the tankers already."

Mallory was unperturbed. He knew that the P&O vice president would be upset with him and he also knew that there was nothing he could do about it. To show anxiety would only be an admission that he had something to be anxious about. The decision to put the nanites on the submarine had not been his alone, but Mallory was not the type to shift blame or make excuses for himself. He knew as well that once the nanites were removed the situation would blow over. Curitiba Technology would no more want publicity about this than P&O would.

"It was considered a good idea at the time, Mr. Lowry, and in fact, we still consider it to be a good idea. The mistake was in using the self-replicating nanites rather than the — ah — sterile ones, for lack of a better term. It was a simple mix-up in inventory numbers. We're still trying to establish exactly what happened. In any case, I believe the decision to carry nanites on board the Aldershot was taken all the way up to the board of directors and was approved. Isn't that right, Archie?"

Archie Baldwin was P&O Director of Environmental Services, a beefy, florid man, in a herringbone sport jacket and red tie. Half a dozen pens were jammed in the pocket of the sport coat and he held another one between thick fingers as he scribbled notes on a clipboard. "Oh yes," he said helpfully. "We've been supplying all the tankers with chemical dispersants for half a decade now. A four percent solution of Corexit 7664 is usual. It's also prohibited by the regulatory agencies, but we use it for the small spills anyway. The nanites were only to improve the efficiency of the dispersant. Worked very well in the lab."

Lowry said, "Hmmph!"

"It reduces the hazard of fire in a spill, Mr. Lowry." Mallory picked up the thread again. "It's for the safety of the crew. We haven't had a problem until now. In fact, we don't have a problem now either. The nanites are still safely on board the Aldershot. We will simply wire the captain not to release them under any circumstances."

Lowry drummed his fingers on desk. "That would be Thompsen, wouldn't it? A good man." He thought some more. "No, Fred, I don't want those nanites sailing into port. If word leaks out and there are government inspectors waiting at the docks, I want that ship to be as clean as a whistle. Is there any way to destroy them at sea?"

"I don't see why not, but the submarine will have to surface," said Mallory. "The dispersant tank is only accessible from the outside. And right now the submarine is under the ice cap. We'll have to wait until it emerges."

"Oh no, let's do it on the ice," said Baldwin. "Perfect place for it. There's no one around to ask questions and the ice cap is a virtual desert. No organic matter to contaminate, as long as we keep them out of the water."

"The Aldershot has ice-breaking capability. She can surface anywhere."

"Archie, how will you decontaminate them?"

"Live steam from the Aldershot's boilers," said Baldwin promptly. "They're designed to be heat decontaminated. Then

we'll do an acid wash, just to be sure."

"How soon can you get a decontamination team out there?"

"Oh, not long. Less than forty-eight hours."

"All right. Make this a priority. And Fred, give Thompsen a buzz and arrange for a rendezvous point."

"Right away," said Mallory.

# # #

A cold wind was coming off the harbor, bringing dampness with it. Nataskovitch left his overcoat unbuttoned and it flapped as he walked along the pier. A few puttering tugs sent soft wakes across the water. The pier itself was nearly empty. He had rationed the workload among the four shifts, but this meant everyone was working fewer hours, and fewer days.

Yesterday he had met with a group of Japanese investors, but the only money they had invested was for their hotel rooms — and plane tickets back home.

It was difficult to find investors in a country that still did not have adequate courts for enforcing contracts, that in many areas did not even recognize the sale of land. Still, the news was not all bad. Exxon was willing to put money into the Sakhalin Islands and the Timan-Pechara regions. Conoco was going ahead with exploration in the Tyumen area of Siberia. But Nataskovitch wasn't satisfied with foriegn investment. If the capital came from the west, the profits would flow to the west also. He wanted a plan where the profits stayed in the *Rodina*.

He reached the end of the pier and gestured at the *Orlyonok*. "She will hold about thirty tons of cargo. So you will be able to get yourself and the remaining devices, and the computer system, and have plenty of room to spare. I know she is far more aircraft than you need, but she was available, and she will do the job."

Borski had thought he was up-to-date on most of the latest technologies, but although he had heard of them, he had never actually seen an ekranoplane up close before. Sitting on top of the water, it looked much like a very modern seaplane, except

that the wings were much too stubby and short, and the turbofans were angled oddly downward. "Can it fly?"

"Oh yes. She can go up to two thousand meters if she has to, though you will quickly lose fuel economy and that will limit your range. But she will cruise all day at fifteen meters, and that should get you over most of anything you will find on the ice cap."

Borski nodded. The A90-150 ekranoplane was a winged ground effects craft. It could move very fast over flat land or water. By staying on the ground effects cushion, a plane requires only one fifth the power, and fuel, it needs to fly at a higher altitude. So the ekranoplane had a very long range. It was perfect for transporting cargo over the Arctic.

Then the ground effect was augmented by the Power Augmented RAM effect. This happened when the Kuznetsov NK-8 turbofans directed a blast of air under the wings. They created a cushion of air that lifted the plane off the ground and let it fly at low speeds, like a hovercraft.

"This is just what we need. Can Stolchave fly this?"

"Stolchave can fly anything I have. Now listen to me." Nataskovitch turned to face him, pulling his overcoat shut and crossing his arms against the wind. "The *Orlyonok* is history. Ekolen is now longer making parts for her; they need all their cash to develop their new line of ekranoplanes. This craft was developed for the military and is just too expensive to operate commercially. So the ekranoplane is expendable.

"But the computer is not. It is old, but we do not have computers to spare. I want that computer control system back, Anton."

"I had no intention of abandoning it, Ivan Nataskovitch."

"Do not act so dismissive, Anton. When the devices explode, the American military will be all over the ice cap. You must get out of there immediately. Do not stick around to admire your achievement. Just tell Stolchave to turn the *Orlyonok* around and bring her right back. She has a cruising speed of four hundred kilometers per hour. You should be back home before

the Americans realize you are there."

Borski had not told Nataskovitch, or any of the rest of the group, about the American woman at the University. He simply nodded. "When I return we will have a celebration." Even as he said this, he knew it would not happen.

"It is too risky," said Nataskovitch flatly. "Even afterward we must keep separate from each other and keep a low profile. All of us." He looked at Borski's face and permitted himself a soft smile. "Maybe in a few years, when the results of our achievement will become apparent. When they start to see us as heroes. We will have a reunion. Then we will drink a toast, eh?"

"Then we will drink a toast." Borski gestured towards the workmen, loading a huge steel canister into the ekranoplane. "Do they know what is in there?"

"No," said Nataskovitch.

The fifty-seven megaton bomb that the Soviets exploded in 1961 was called a fission-fusion-fission bomb. A large A-bomb was used to ignite a small H-bomb. The neutrons from the H-bomb caused the fissioning of the bomb's uranium casing, turning it into an even larger A-bomb. This gave a very big explosion in a rather compact casing.

However, while H-bomb explosions can be made quite clean, A- bomb explosions are always rather dirty, producing a lot of radioactive fallout particles. Early on, Borski and Batistein had decided that F-F-F bombs, and similar types of booster bombs, were not suitable for what they had in mind.

Instead they went to an older and simpler design, where a small A-bomb was used to kindle a huge hydrogen burn. Size was not an obstacle, since the bombs were not meant to be installed in missiles. Still, they took great care to keep the A-bomb trigger as small, and clean, as possible. The actual design that Batistein's people came up with used a strip of uranium no bigger than a stick of chewing gum.

Neither the Americans or the Soviets had prepared many weapons that were bigger than twenty megatons. There is no

use for them in wartime. If a twenty megaton bomb is exploded above the ground, the blast will send fallout into the upper atmosphere, where eventually it will drift around to the country that sent the bomb over. So Pavel Batistein had no experience in building a really large bomb. He knew, however, that there was no theoretical limit to the size of the hydrogen bomb. You just added more fuel to get a bigger bomb.

"No." Nataskovitch shook his head. "Pavel has maintained good security. His own workers think they are for Soviet military production, and the inspectors do not worry as long our own inventories of uranium and plutonium are accounted for. The containers are completely unmarked, and once they leave his factory no-one knows what they are. The Russian worker still does not ask questions. That is a bad thing for the country, but a good thing for us. Hopefully it is changing, but not yet."

"How about the men who designed the detonation control?"

"They know they are detonating explosives, but they have no idea of the the nature of them. They still think they are doing a seismic survey."

"Well," said Borski. "I wonder how long that cover story will last."

# # #

Like many international corporations, P&O had its own methods for encrypting confidential messages. The methods had been developed a decade ago with the knowledge that its tankers might become targets for terrorism. The truth was, however, that the ciphers had been used but rarely. Most of P&O's radio traffic had to do with movement and scheduling of its ships, and there is little that can be done to keep secret the movements of something as big as an oil tanker. And unlike a government, a corporation is constrained to turn a profit. To maintain a secure communications system among its hundreds of tankers would have imposed upon P&O a certain cost structure that simply could not be economically justified.

But if anyone *had* been monitoring P&O's radio traffic, a single encrypted message among hundreds of other messages

broadcast 'in clear' would have stuck out like a sore thumb. So despite Mallory's desire to maintain a low profile on the destruction of the nanites, he decided to send a plain english text message to Thompsen and trust the man to figure it out.

Thompsen did figure it out. Shelly had picked up the message with the OMEGA floating wire antenna, scanned it on his monitor, and transferred it to Thompsen's cabin monitor without printing it out. Thompsen came to the bridge somewhat exasperated, but his voice was perfectly calm when he spoke to Takanasha. "I expect you will be pleased at this news, Mr. Takanasha. We have decided to destroy the nanites on board."

"Is that so?" said Takanasha, which is what some Japanese say when they are surprised.

Davis and Shelly had already seen the message, but had kept silent until Thompsen announced it publicly. "The home office is sending a decontamination team to sterilize the dispersant tanks, as they put it. Didn't mention the nanites, but used the word 'sterilize' several times. My assumption is that Mr. Takanasha was right and perhaps our nanomachinery is not as safe as we thought it was."

"I am pleased that P&O has decided to take a cautious approach to this problem." Takanasha was relieved. Nonetheless he thought it best to adopt his most businesslike tone of voice.

Thompsen merely looked amused. "It's another delay, but since it's orders from the home office, it can't be helped. I expect they want to do it out here where there is no-one to see us. Mr. Davis, you will find the rendezvous and notify me when it is time to surface."

"Yes, sir." Davis had already begun plotting the course changes as soon as the message had come in. The ice-search sonar would locate soft sea ice to surface through.

"Archie Baldwin will be flying out to meet us. A good chap, Baldwin. Likes his toast buttered on both sides. Mr. Shelly, remind the galley of that."

"Yes, sir." Shelly was not happy. He had sailed under

Thompsen long enough to know that the man got irritated at little things. The fact that he was so calm about this suggested to Shelly that the Captain was more concerned than he led on. And small wonder. If the boat really did have unrestrained nanites on board, they would have to be treated with great care.

"Coming out himself, so he thinks this is important. Could be he's taking some heat from the environmental people. Says he's bringing his own team and equipment, so we won't have anything to do with it. Mr. Shelly, have engineering ready a set of steam fittings and hoses, just in case they're needed."

"Aye, sir."

"Well then," said Thompsen. "We'll see if we can't get this over with quickly and get back on schedule."

# # #

The Arctic Ocean is big, and until recently, it was largely unknown territory. Stretching from the fog shrouded Bering Straits to the fjords of Scandinavia, from the frozen coast of Greenland to the Taymyr Peninsula of Siberia, covering over twelve million square kilometers, and four thousand meters deep in places, it comprises an immense mass of water perpetually hidden from view by a constantly shifting body of ice. Prior to the development of the nuclear submarine, more was known about the Moon than about the top of the world.

Shortly after World War One, Harvey Hayes of the U.S. Naval Experimental Station in Annapolis, Maryland, invented the sonic depth finder. Before then, depth readings were obtained by the laborious method of leaded weight and sounding line. Now, a ship could take continuous readings without stopping. The readings were compiled by the U.S. Naval Oceanographic Office into contour maps of the ocean floor. The first such map of the Arctic Ocean was produced from bathymetric readings made by the submarine Nautilus as it cruised beneath the ice pack. This was published in 1958 and it was shortly afterward that Dr. Wexler made his prediction.

On the surface the idea seemed, as Lottie had succinctly put

it, *really stupid*. Wexler's staff made the same observation to him, although they phrased it somewhat more tactfully. A one megaton atomic bomb generates about four and a half trillion British Thermal Units of energy. A BTU is the amount of energy needed to raise the temperature of a pound of water by one degree farenheit. To raise the temperature of the Arctic Ocean by even a single degree would require over eight million megatons of energy, and that didn't even count the latent heat required to melt the ice. Clearly this was an unobtainably large amount, even by the standards of the atomic age.

But Wexler had a more sophisticated plan in mind. The energy to melt the pole was indeed available, far to the south. It had been generated in the hot fusion fires of the sun and captured in the warm waters of the equatorial Atlantic. It had only to be delivered to the north. And the vehicle for delivering it already existed.

The Gulf Stream is a system of intense ocean currents that flows along the western boundary of the North Atlantic Ocean. It originates in the placid, sun baked currents of the equator and flows northward through the Straits of Florida, over the Continental Shelf to Cape Hatteras. There it doubles in width — to about ninety miles — but loses none of its strength — an appreciable current has been detected at depths greater than six thousand feet. Still moving at five miles per hour, the Gulf Stream carries four hundred billion BTUs of energy *every second* into the North Atlantic.

(The Kuroshio, flowing northward along the rim of the Pacific, does not carry appreciable warmth.)

But the mighty Gulf Stream meets its match at the Grand Banks, off the coast of Newfoundland. For the warm, light waters of the south are shoved aside by the icy, dense waters of the Labrador Current, chilled beneath the pole and sent south through the Davis Strait, the narrow, deep rift that separates the glacier cliffs of Greenland from Arctic Canada. Unable to penetrate the heavy cold of the Labrador, the Gulf Stream turns east and meanders out into the North Atlantic.

Even after crossing that storm tossed ocean it still carries enough warmth to temper the climate of Britain, but most of its energy has been diffused. And the Arctic Ocean remains frozen.

# # #

"Just who the fuck is this guy Borski anyway?" said the Secretary of State. He was a red faced man who liked to start off meetings on a direct note and keep them that way. He had insisted that everyone get together in his office so he could keep the meeting small and controlled.

Carlyle looked uncomfortable. He had taken a day off to go to the dentist, had been called to this meeting at very short notice, and was wearing a sport jacket and open collared shirt. So he felt underdressed, unprepared, and his mouth was still slightly numb from the Novacain. All the rest of the men, even Murli Naramanchi, were dressed in very conservative dark suits. General Manyard was in a dress uniform.

Lottie was wearing a Duke University sweatshirt and sweatpants. Carlyle was glad to see her.

"He's a Russian scientist," said Carlyle. "He has degrees in both meteorology and civil engineering. He's held a number of scientific and political posts. He was a member of ISKAN . . ."

"Which is what?" Ventner had not been chosen as Secretary of State for his knowledge of foriegn affairs. He was picked as a reward for dropping out of a close primary and throwing his support to the President. He had little patience with jargon.

"Institute of the United States and Canada. It's a think tank of the Soviet Academy of Sciences. Very forward looking, Lots of blue sky projects."

"Anything to do with hydrogen bombs?"

"He was also connected with IMEMO, the Institute of the World Economy. IMEMO worked out the details of the INF and START treaties, things like that. He's bound to have knowledge of the nuclear industry."

"And in Canada," put in Danello. He had been unable to locate Macpherson, still out fishing in Arkansas. "He was also

on the AIDJEX project. It was a joint study between the Soviet Union, the United States, and Canada, on Arctic Ice Dynamics."

"So he gets around."

"He's part of the academic mafia. They sell university admissions and certificates to the children of the *apparatachiks*. So yeah, we can figure he has a lot of connections."

"If you have so much intelligence on this guy, how was he able to get away with all this for so long?"

"We don't know anything about him," said Carlyle. "He wasn't a player in the military, politics, or intelligence, so we didn't open a dossier on him. The file we gave to Lottie was just stuff we got from the MVD. But this is old information. About five years ago he dropped out of sight. The MVD is going to check with Petrovka 38 . . .."

"A Moscow special police branch that handles international crime," interrupted Danello.

"Thank you," said Ventner.

"They're very interested now. But the MVD swears that nothing in their nuclear stockpile is missing."

"The Canadians said the same thing," said Lottie. "Except we know better."

"With all due respect," said Ventner, "This sounds like bullshit to me. When the ice caps melt the sea level will rise. I think four hundred feet was the number quoted to me during the last global warming conference. We'll be inundated. Even the Russians know that."

"On the contrary," said Murli. "It is quite a clever idea. The sea level will not rise four hundred feet unless the Anarctic melts. The North Pole is floating ice, so when it melts it won't change the sea level. The only increase will come from the melting of the Greenland ice cap, which will only raise the sea level about one hundred feet."

"Well," said Lottie, "One hundred feet. That still sounds like a pretty tough break for, say, Florida."

"It will not happen all at once. The rise will be about forty feet per century for two and a half centuries. There will be

plenty of time to prepare. Think of how much society has changed since the beginning of this century. The world would have changed drastically in two hundred years anyway."

Senator Breis was from one of the flat, agricultural states, that was basically known for growing corn. Kansas, or Nebraska, or Oklahoma. Lottie couldn't remember which one. He said, "I think the what we have to examine here is the subject of climate changes. General Manyard, didn't the Pentagon fund some computer modeling a few years back? Connected with a global warming study?"

"Project Nile Blue," said Manyard. He had a folder on his lap and he opened it. "The conclusion of the report was that a shrinking of the Arctic ice cap would cause an expansion of the Circumpolar Vortex. That's what they call the mass of cold air that sits on top of the Pole. Around the edge of the circumpolar vortex runs the Jet Stream, and below that flow the westerly winds that bring moisture from the Pacific.

"If the vortex expands, the prevailing westerlies will shift south across the Mexican desert. So, more rain for Mexico, less for us."

"I was connected to that project," said Murli. "The report also said that the total amount of arable land in the world would increase by eighteen percent. With people starving in the African Sahel, we have no right to stop such a plan."

Breis half rose from his chair. "To hell with that! I'll be damned it I see my state turned into a dustbowl!"

"What are you eating?" said Ventner.

This change of subject served to relieve the increasing tension in the room. All heads turned to look at Lottie, who had taken a box from her handbag and was wiping crumbs of chocolate from her mouth. "Devil's food cookie cakes. Want one?"

"Ah, no thanks. My wife doesn't want me . . ."

"They're fat free."

"Oh. Well, maybe one. Thanks."

She proffered them also to the rest of the group, who

politely declined, but while Ventner was eating, she put her handbag on his desk and took out a folded map. This turned out to be a National Geographic map of the Arctic Ocean.

"Murli, check me if I'm getting this wrong. Mr. Ventner, let's forget about that Gulf Stream stuff for a moment. What we're interested in is called thermohaline circulation. Right? This is when the cold water at the high latitudes sinks to very great depths, because it's denser. Then it flows horizontally along the ocean floor. Right, Murli?"

"That is essentially correct, yes."

"Okay, so let's look at this map. The coldest water comes from the deepest basins. That will be the Canada Basin and the Fram Basin. Right?" She showed them to Ventner. "Now the Earth spins from east to west, so that means the water tends naturally to flow west to east." She traced a line with her fingers from west to east. "And then the Corialis effect gives the current a right hand twist, so where is this water going to go?"

Ventner looked at the map. He ran his finger down the east coast of Greenland. "Here. Through the Denmark strait."

"Right. That's where it *should* go. But it doesn't. Instead it filters through the Arctic Islands until it gets through the Davis Strait and becomes the Labrador Current."

"This was not always the case," said Naramanchi. "Prior to the last glacial epoch, the Arctic was much warmer and the bulk of the cold water flowed from the east of Greenland Plateau. We know this from sediment analysis."

"What made it change?"

Naramanchi shrugged. "Cometary impact, perhaps?"

Lottie picked up the thread again. "So what Wexler and some other people proposed was to plant nukes here." Her finger circled an area on the map above Greenland. "Along the edge of the Fram basin. The blast would redirect the current through the Spitzbergen fracture and into the Denmark Strait, the Gulf Stream would swing north . . ."

"Lottie, this sounds extremely far fetched," said Ventner. "I

see computer projections all the time and none of them are worth pissing on. Nobody is going to set off twenty nukes based on a computer projection."

"It doesn't matter if it's true," said Breis. "What matters is if they *believe* it's true. They seem to have a lot of money behind them. Someone must believe this will work."

Carlyle took a photo from a manila envelope and put it on top of the map. "The Russians have a more cavalier attitude than we do toward the use of nuclear weapons. They've used them for strip mining and to staunch oil-well fires. Stupid stuff, but true." He tapped the photo. "This is a picture of an artificial lake sixty-five miles east of Semey. They wanted a reservoir there, so they detonated a shallow, underground atomic bomb to make a crater. The downwind population was horribly exposed, but they did it anyway. That's the kind of mentality we're dealing with."

Manyard said, "I don't see this as a question of international policy. Neither of ours, or the Soviets. We have no evidence that these people are sanctioned by any legitimate government. They appear to be terrorists, and I cannot believe that we will tolerate thermonuclear weapons in the hands of terrorists."

"Yes," said Breis. "Exactly."

"All right," said Ventner. "Just where are these bombs? Are they set in the ice?"

"No," said Lottie. "Most of the ice is only five to nine meters thick."

"If they want a clean explosion they won't set them on the sea bottom," said Manyard.

"Our consultants suspect that they are suspended beneath the ice on some sort of framework," continued Lottie. "Just how deep would depend on how big they are and that we don't know yet. They would be set to give the maximum heat sink and pressure wave."

Breis drummed his fingers. "Can we locate them with sonar? Send in a team of SEALs and disarm the bombs from below?"

"Not with certainty." This was from Manyard again. "The constant grinding of the ice pack creates too much interference with sonar."

"Magnetic anomaly detection?"

"Not big enough."

Lottie said, "I've already assembled a set of satellite photos showing the locations where their drilling platform has been operating over the past year. However the ice pack rotates so the bombs will have shifted position somewhat since the photos were taken."

"The Nuclear Emergency Search Team has specialized equipment to locate MUF," said Carlyle. "It's already aircraft mounted and they can mobilize on short notice."

"All right," said Ventner. "The President has called a meeting with the cabinet and the Joint Chiefs of Staff. Hopefully, the MVD or Ottawa will get back to us with a better explanation of what these people are doing up there. If they don't, well, I'll recommend to the President that we send a force out to capture this base camp, to protect this country from . . . whatever."

"Environmental warfare," said Lottie.

"Sounds good. We'll send Seal Team Six, or whatever we're using against terrorists these days."

"It's up to the Joint Chiefs," said Manyard. "But the 6th army at Fort Wainright is located right on the Alaskan slope and is trained and equipped for cold weather operation."

"Fine."

Carlyle said, "We have an agent in place at the camp."

"All right," said Manyard. "Arrange for the Case Officer to go along."

A hush fell over the room. Bainbridge, Danello, and Carlyle all looked at Lottie Deno.

"Oh dear," she said.

# # #

Fort Wainright, home of the U.S. Army 6th division, sits on the edge of the Arctic Ocean slightly south and to the east of

Point Barrow. Originally it was situated to counter a Soviet threat from across the Bering Strait, but, with the cooling of Soviet tensions, its mission was redefined and the 6th division is now considered to be a global force. By going over the ice cap armed units can reach Europe faster than 95% of the other US forces, including the 82nd airborne.

Not by coincidence, Fort Wainright's location also puts it at the very edge of the Alaska Strategic Petroleum Reserve, and within a short striking distance of the oil facilities at Prudhoe Bay. Although its mission statement does not specifically address the issue of security for the Prudhoe Bay, US military planners do admit that, in the event of an attempt to stop the flow of oil from Alaska, light infantry from Fort Wainright would be first on the scene.

Following a growing military trend to integrate National Guard training with the active units, the Alaskan Eskimo Scouts, a forward reconnaissance unit, now fall also under 6th Division command. Shortly after Lottie's discussion with the Secretary of State, Kyle Wegmer zipped a pair of white GoreTex coveralls over his battledress uniform, and boarded a twin bladed CH47 Delta Chinook with the rest of his eight man squad. While the chopper flew low and fast over the icecap, the men checked their equipment, which included a special low profile arctic tent, Yukon stoves, and heated canteens to keep their water from freezing. Thirty miles from St. Vincent's platform the Chinook set down on the ice. The Scouts emptied out and quickly donned cross-country skies. Their equipment was loaded on two Ahkios, long toboggans that skiers could pull. Four hours later Wegmer had the drilling camp in view, his overwhites camouflaging him as he observed the platform through binoculars.

# # #

Normally submarines receive radio messages via a floating antennae, which can be sent up or reeled in as needed. Because the antenna can give away a submarine's position, the U.S. Navy has developed an array of Extremely Low Frequency

(ELF) transmitters, that can penetrate beneath the ocean's surface.

The Aldershot was equipped with an Omega floating wire antennae, and could receive messages even under ice. (ice is fairly permeable to short-wave radio waves) However, it was not a military submarine and did not have ELF capability. Thus its officers remained unaware that the Pentagon had sent an urgent message ordering all its submarines out of Arctic waters.

"Found one," said Shelly.

The rest of the officer gathered around. He pointed to the ice search sonar, which showed the thickness of the ice in various shades of blue. "A large polyna, and it's only recently frozen over. The ice is about six inches thick and it's sea ice, so it will be mushy."

"Prepare to surface, sir?" said Davis.

Thompsen considered it. "Mr. Takanasha, how are we doing with those condensers?"

"The leak has been found. It is being plugged."

"Very good," said Thompsen. "No, Mr. Davis. Simply make a note of the spot and circle until the rendevous time. The polyna could decide to close up at any time, and if we surface now, we might only have to dive again anyway." For Takanasha's benefit, he explained, "The ice will freeze about an inch every hour, so we have a fair amount of time to punch through." Takanasha nodded.

"At least they'll still have light to work by," said Shelly.

# # #

Peribonca Lake was largely deserted in the late fall. Enough ice hugged the shores to make boating treacherous and fishing unpleasant. When the lake froze over it would become dotted with ice fishing tents and huts, but for now Brian Painchaud felt totally alone. He did not expect to be found so fast.

The easiest place to hide is in a crowd. If, for example, Painchaud had driven south, across the border into Vermont, and mingled with the tourists in one of that state's many ski

resorts, he could have remained undetected. St. Vincent's co-conspirators would not have pursued him into the United States. However, Painchaud was reluctant to enter a country whose intelligence services might very well know that he was plotting against them. And he preferred to stay among the French speaking Quebecois. So he packed his textbooks and his notebook computer, his parka and snowshoes, and drove north on route 169 to Lac St. Jean, and from there took the narrow and winding highway to Chute-des-Passes, at the southern tip of Lac Peribonca. There the highway ended and rest of the country, thick stands of black spruce springing from deep, spongy beds of caribou moss, was accessible only by chartered aircraft and snowmobile. The lakeside cabins had docks and most were reachable only by boat. The cabin owned by Michelle's father, however, was within a few miles of a logging road. From there, dirt tracks led to it that Michelle's 4WD Suzuki was able to follow without much trouble. Painchaud unpacked his sleeping bag and computer and settled in to wait for the bang.

He was at the water's edge, chopping some driftwood for the cabin's stove when he heard the drone of a light aircraft. There was nothing alarming in this — small planes are a common means of transportation in rural Canada — but Painchaud dropped the ax and headed for the shelter of the trees anyway. Minutes later a DeHaviland Beaver appeared over the lake, banked, and flew in a low circle.

Painchaud watched it from behind a black spruce. The plane did one circle out over the middle of the lake, and then came straight towards him.

"*Chrisse*," muttered Painchaud and broke into a run. That was too much of a coincidence and it had only taken the plane a moment to fix on him. "They must have a infrared detector." His body heat would stand out against the chilly countryside.

The plane roared overhead and in the cabin he saw a man in an RCMP uniform. Painchaud swore to himself again and climbed higher along the lakefront slope, where the woods

were thicker.

The plane came back for another pass and this time he saw that the cabin door was open. The Mountie was sitting in the doorway, his legs dangling out over open air. Across his knees lay a rifle with a telescopic sight. The plane passed less than two hundred feet from Painchaud, but the Mountie made no attempt to lift the rifle.

Painchaud continued to circle back towards the car and the logging road. He realized that the Mounties wanted him to lead them to the cabin he was staying in. Rais would want to know if he'd taken any information with him, and if they shot him now they'd have to search all the ones in this area. That was fine with Painchaud. If they let him get back to the cabin he'd be able to get back to the Sidekick, and once in a vehicle he thought he'd have a pretty good chance of getting back to Chute-des-Passes. In fact — his mind clamped down on this glimmer of hope — it could be they wouldn't hurt him at all. Maybe they just wanted to talk to him.

The drone of the Beaver's engine grew louder as it came in for a third pass. Painchaud looked back and instantly caught the glimmer of red light on the shoulder of his parka. Laser sight! He dove into the snow and the crack of the rifle interrupted the plane's roar, the bullet throwing up a puff of powder from the ground at his side. He scrambled to his feet immediately and ducked behind the nearest tree. A second shot threw chips of wood in his face as he hunkered down at base of the dark, wet trunk.

The Beaver was past him now and beginning another circle. Painchaud hesitated only a moment and began running again. He had only been hunting once before, but he knew that to hit a moving target was substantially harder than a shooting something still, and to hit a moving target from a moving vehicle was very difficult indeed. The cabin was a bare hundred yards away, two blank windows facing him. The door was on the opposite side though, and was latched, and the plane was coming right toward him. He could see the Mountie lining up

the rifle on the door now. Painchaud pulled the hood of his parka over his head and kept running. When he reached the cabin he threw his arms up over his face and dove in through the window, landing flat on his stomach in a shower of broken glass.

Jean Rais was in the cabin.

He was seated in a wooden chair and he held a .455 Webley revolver, an old standard of the Mounted Police, on his lap. He started to say something but the roar of the plane overhead drowned him out. He waited until it passed by and until Painchaud had pushed himself up to his knees. "That was very impressive, Brian. I think that, on the telly, they actually hit the floor in a roll and come up on their feet. Also they never seem to cut themselves."

Painchaud looked at him and didn't say anything. There were deep scratches on the backs of his hands and small punctures on his chest and stomach. He felt wetness on his face. He put a hand to his head and took it away smeared with blood and fluffs of down. The glass had gashed his scalp right through his parka.

Rais rose and walked to the bathroom. He came back with a towel and tossed it to Painchaud, who put it to his head. "We were worried about you, Brian. You ran out on us without saying a word."

"I needed some time to study." Painchaud got up and pulled up another chair. He was sweating, despite the draught from the broken window. His eyes were fixed on the gun in Rais's hand. He realized that, but he couldn't make himself look away. Rais seemed perfectly calm.

"Left in a bit of a hurry, didn't you? Your girlfriend is looking all over for you."

Painchaud was silent.

"Why don't you tell me about the break-in?"

"There was nothing I could do. There was at least four of them. They burst through the door and knocked me out before I could move. When I woke up they were gone."

"Who were they?"

"I don't know."

"American accents? British Canadian? French Canadian?"

"I don't know. They didn't say anything. They didn't get into the computer. Everything is fine."

"Brian," said Rais warningly. He lifted the revolver ever so slightly.

Painchaud's shoulders sagged. The blood was soaking into the towel and he was feeling sick, even sicker than he felt when the girl beat him up. "All right. It was the Americans. It's all over. They know everything."

Rais leaned forward. "Now, why do you say that?"

Painchaud pointed to his notebook computer. "Last night they redeployed an ALEXIS satellite. They had it over Korea, now they've got it into a high inclination orbit. This morning they repositioned another one. They've got nearly twenty-four hour polar coverage now."

ALEXIS satellites were sent up for the special purpose of detecting nuclear explosions. Rais narrowed his eyes. He did not doubt Painchaud's ability to intercept information. But he was suspicious anyway. "You are bluffing, Brian. There are no telephones, and no cable in this area. What is that computer hooked up to?"

"Michelle's father would never miss a Nordiques' game. There is a satellite dish up on the hill. The Americans must be moving in right now. It's finished."

Rais stood up. "No it isn't. We can detonate right now. Can you send messages on that thing?"

"No. It's just a receiving dish."

Rais had the portable scrambler in his car. "Where is the nearest telephone?"

"Chute-des-Passes, I guess."

Rais grabbed his overcoat from the chair and pulled the door open. But in the open doorway he paused for a moment in thought and then swung back around. "You've been very helpful, Brian." He brought up the revolver.

Painchaud winced. Then Rais dropped his arm and stepped outside. The door swung shut behind him.

It took Painchaud a moment to realize that Rais was gone, and another minute to get his feelings under control. He was off the hook! They were going to let him alone! He wiped his forehead once more and threw the towel in a corner, then walked to the door. When he heard Rais's car pull away, he opened it and watched it pull away. He smiled with relief.

Then he turned his head and saw the Mountie leaning against the corner of the building. The rifle was steady in his hands and the red gleam of the laser sight focused unwavering on Painchaud's chest.

# # #

"What do you think of my machine?" said Borski.

"Very impressive," said St. Vincent, and he meant it. He was proud of his own DeHaviland, now seated at the end of the ice runway with its propellers slowly turning, but it was about as impressive as a seagull compared to the giant wingship. The ekranoplane, when it came barreling over the white horizon, had looked like a Boeing 767 on permanent takeoff. The powerful Kuznetsov turbines were idling now, keeping the plane from icing over in the Arctic cold, and the rear loading ramp was dropped down to the ice. St. Vincent followed Borski up the ramp and into the cargo area, which had electric space heaters and was relatively warm. The Russian grinned. "A neat trick, eh? We unload from the bottom, and the cold air will not rise into the plane."

"Very nice. I spent the night in an igloo once, and it works the same way. We slept on a shelf above the level of the entrance tunnel. The cold air blankets the floor and the warm air can't get past it to escape. As I recall, it got up to forty degrees inside on the sleeping level."

"So we can still learn something from the old technology. And here is the new technology." Borski patted the computer. It was clear that it had been modified for industrial use. The case was metal, painted gray, and it had been sealed to keep

out dust and moisture. A square of plexiglas shielded the CRT screen and a flexible rubber cover protected the keyboard. It looked extremely sturdy. "It is all here, preprogrammed and ready to go. I merely have to enter the codes for each of the detonation sites. The computer will read the locations from the transponders and calculate the detonation sequence."

"We will have to go to radio silence," St. Vincent said. He moved past Borski into the cargo bay. "To prevent stray signals from detonating the explosives. I know that isn't going to happen, but it's standard procedure and the men will be nervous if we don't follow it." The last bomb, housed in its unmarked white cylinder, rested on foam blocks. Thick canvas straps held it securely to the bulkhead. It was odd to think that so much power could be contained in such an innocuous looking package. "We are not quite ready to install this one. We had a bit of a delay, two of the lag bolts holding the support frame together split. The cold does that sometime."

Borski looked at the metal canister. "Well, it is here when you are ready."

"We will go ahead and move it onto the platform anyway. The wind is going to pick up and we'll want move it while it's still relatively calm."

"Alas, the wind will ruin our little cold air, warm air system. Were there any more fly-overs while I was away? Oil industry scouts, or someone trying to look like scouts?"

"No. It's been very quiet."

"Has there been an increase in radio traffic?"

St. Vincent smiled. "This isn't a listening post. I have no idea. Certainly we're not getting any more calls."

"Have there been any queries made to Ottawa about the status of your company?"

St. Vincent lost his smile. "Not officially, no. But Jean believes discreet inquiries have been made about us."

"CIA? Or CISIS?"

"He didn't know. Actually . . ." St. Vincent hesitated. "Actually, I was expecting to hear from Jean and he hasn't

checked in."

Borski nodded gravely. He had grown up, and lived most of his life, in a police state, and he tended to see the long arm of government control in everything. This time he was partly right. "They know about us. I believe that. He has broken contact because he knows he is under surveillance. They are probably watching us by satellite right now. They will try to stop us. But I don't think they can stop us in time. Out here, we are too far away for any sort of quick action."

"We will be ready this afternoon," said St. Vincent.

# # #

Qaanaaq, on the coast of Greenland at the northern tip of Baffin Bay, was without a doubt the most miserable place Ray Alexander had ever been to. Outside the P&O's Cessna Citation, the temperature was twenty-four degrees below zero and still dropping. God only knew what the wind chill factor was.

Archie Baldwin came out of the jet and sucked in the cold air, letting it sear his throat. "Quite a change from Rekjavik, eh?"

"We should have stayed there." Ray was downwind and had to shout. "Tried some of those hot springs you were telling me about."

"Maybe on the trip back." Baldwin looked around, although there wasn't much to see except a lot of paved runway. Qaanaaq had been the location for Thule Air Base. At the height of the cold war ten thousand men had been stationed there, first constructing and then supplying the DEW line radar stations, or manning the strategic bombers that constituted one third of America's nuclear triad. The B52s and the Phantoms had been withdrawn years ago and now Qaanaaq was mostly used as a staging area for oil exploration. For this, Baldwin had to admit, it was ideally situated. The whole of the Arctic was accessible from Qaanaaq.

Lowry wanted minimum disclosure of the nanite problem, and since the decontamination procedure was not complicated, Baldwin had decided that Ray Alexander, one of the company's

best safety operators, could do the job with Baldwin assisting. He had even flown the Citation himself, from Banfry Bay to Iceland, and from Iceland to Qaanaaq, across the top of the Greenland ice cap, an incredible spread of glacial desolation that even the Inuit dared not cross. Baldwin flew well enough and made competent landings, even in the fierce crosswinds at Qaanaaq. However the Citation was not equipped to land on the ice, and it was unlikely they'd find a clear path for it anyway. Another mode of transportation was needed.

It soon arrived. The Ishida TW-68 was a tiltwing turboprop, the civilian version of the military Osprey. With its sharp nose and streamlined body, it looked like many another commuter aircraft as it came in for a landing. Only the high set wings suggested it might be a VTOL.

Alexander said, "That's for us?"

"Supposed to be."

The tiltwing took twenty seconds to make the transition from turboprop to helicopter, the wings turning smoothly up, and the forward airspeed gradually declining until it was hovering almost directly above them. Now they could see the ducted air fan below the tail that provided pitch control. The tiltwing descended and came to a feather light stop not fifty feet away.

"Good landing," said Baldwin. "If he does that on the ice, I'll be happy."

"Yes. Must be an expensive son of a bitch."

"But cheaper to fly than a helicopter. And longer range. And faster."

They waited while the pilot went through his post flight checklist. Eventually he left the cabin and came out through the door under the wing. He stepped out with his parka open, gave a look of surprise, and stepped back inside again. When the door opened a second time he had his parka zipped to his chin and the hood pulled over his head.

He ran toward them with his shoulder hunched against the wind. "One of you guys Archie Baldwin?"

"Yes," said Baldwin

"Ray Alexander," said Ray Alexander.

"Tom Lebroux," said the tiltwing pilot. He took his right hand out of its pocket just long enough to shake hands briefly, and put it back inside. "I saw the P&O logo on the Citation and figured you were waiting for me."

"Hell of an aircraft," said Baldwin.

"Thanks," said Lebroux, just a little proudly. It was clear to Alexander that Lebroux and Baldwin were going to talk airplanes for the rest of the trip. "Came up from Saint Johns, they told me you needed it for a hot project."

"Yes," said Baldwin. "We can leave whenever you're ready."

"Gotta' fuel up and get some dinner. And you better get that Citation under cover if you don't want it iced up when you get back."

"They're getting space for us now. We have some equipment to move first."

"Okay," said Lebroux. "Food, fuel, cargo, and preflight check-out. We ought to be ready to take off in a couple of hours."

# # #

A fissure had opened in the ice just west of the camp and clouds of steam were rising from the open water. Together with the condensation clouds from the ekranoplane's tail mounted turboprop, visibility was reduced enough for Daily to walk, unnoticed, up the cargo ramp into the plane's belly.

What he saw was not very informative. He had watched six crew members, accompanied by Borski and St. Vincent, slide the large, unmarked metal canister into a Nodwell, and then move it into the drilling platform. Left inside were merely the canvas straps that had held the canister in place and the foam blocks that had supported it. Farther forward, metal shelves had been bolted to to inside of ekranoplane and lots of transmission equipment had been bolted to the shelves. Cables ran along the floor to a computer the size of two filing cabinets. Its CRT screen was blank and dark. There were no notes or

manuals around. It didn't look like anything that Daily was capable of messing with.

But taped to the bulkhead above the computer was a map. A number of small circles had been drawn on it in red marking pen, with numbers written beside them. Daily looked more closely. It was a map of the Arctic ocean, showing topgraphical details of the sea bottom. The numbers showed longitude and latitude. "All right," he murmured, and reached into his pocket for a pencil and note pad.

The map showed the location of the other hydrogen bombs. Lottie had nearly located them already, determining the platform's drilling sites from old satellite photos and oceanographic records of the pack's ice drift. But Daily didn't know this. The map was similar to the geological survey maps used by oil companies and to Daily, oilfield data was always important information.

"Hello. What are you doing?" Borski was standing in the cabin door. He had one hand in the pocket of his parka.

"Just taking a break," Daily said easily. "The condensation from all the exhausts had frosted up my goggles."

Borski smiled and moved into the cargo bay. He put on hand on the computer and kept the other in his pocket. "Yes, well, please do not touch any of this equipment." His hood was pulled over his head and it shadowed his face from the overhead lights of the cargo bay. Only his eyes and teeth could be seen. "It is very sensitive to begin with and the cold makes it fragile."

The cargo area was plenty warm, but Daily merely said, "I was being careful." He was careful not to look directly at the map.

"That is good." Borski hesitated, then tried to put a friendlier tone in his voice. "We will be doing our seismic mapping soon and this is radio equipment. We don't want any of the charges to go off prematurely."

"Absolutely not," said Daily, who knew there was considerably more there than just radio equipment. "Well, back

to work." He bounced casually back down the loading ramp and walked off the runway. Borski stared after him for a long while.

# # #

A military quartermaster, if asked, tell you he can move a fully equipped combat divison anywhere in the world in four days. He will be lying. If an airstrip is available, an entire base camp can be transported across the world in less than twenty-four hours. At the beginning of the Gulf War, the first troops began landing in Saudi Arabia a mere eight hours from call up.

This time call up came over MILNET, the military equivalent of Internet, and was received by the Signals division at Fort Wainright. Signals contacted the Group Operations Center, which chose an operational plan from a book of such plans — developed and practiced in advance — modified it, and began recall of the incursion team.

Each soldier on the team already had his kit packed and ready to go. The kits, brought out for inspection every three months, were stored on pallets in a warehouse. While the soldiers reported to their barracks for an identity check, the pallets were taken out of the warehouse and set out in a hanger. The officers were sent to the briefing room. The rest of the incursion team picked up their kits and reported to the infirmary, where their Medical Emergency Card was brought up to date. Those who had not had a recent tetanus injection were given one on the spot. While they waited in line, the senior NCOs inspected their kit bags — absolutely no alcohol was allowed and it was amazing how many men liked to carry a bottle. Weapons were stored in the armory, packed in crates and stacked on pallets. The officers signed out the weapons and forklifts laid the pallets out on the runway.

After leaving the infirmary, the team members reported to the auditorium in the operations building, where they were briefed by the public affairs officer. NCOs issued weapons and ammo to them just before they boarded the helicopters. It was at this point that Lottie arrived.

She was wearing a sweatsuit and ski jacket of neon pink

and neon green, colors that had been fashionable the last and only time she had gone skiing. A long time resident of Washington, she owned the usual collection of wool coats and scarves, but the ski jacket was the only really cold weather clothing she had and there had been no time to get outfitted with something more practical. A stylish pair of brown leather boots completed the ensemble, making her look, she thought, especially ridiculous. She felt better, however, when she reached Fort Wainright.

"My God," she said. "It's the invasion of the Pop'n Fresh Doughboys."

"Camouflage overwhites," said the soldier. "We all wear them." He was some sort of non-commissioned officer, a corporal or a sergeant or something. Lottie couldn't tell one rank from another. Then he held out a set for her. She stared at it in horror.

"I'll look like Frosty the Snowman!"

"Sorry, ma'am. Colonel's orders."

Lottie had once vowed that she'd only wear white if it was a wedding dress. The white GoreTex gave her more resemblance to a wedding cake, but she did appreciate the way it cut the wind that screamed across the tarmac. She had been hustled to Andrews Air Force base in a State Department limo, with Bainbridge and Carlyle giving her verbal instructions on the way, flown up in the freezing hulk of a KC-10 Extender, and just had time to grab a single cup of coffee and a Milky Way bar upon landing. The NCO waited while she donned the coveralls, then led across the runway to clamber into an MH-6 Little Bird helicopter. The pilot flashed her a brief smile before turning back to his instrument panel. The NCO gave her ID to an officer in the co-pilot's seat, who was speaking into two radios and at a communications officer. She hunched herself into her jacket and huddled on one of the canvas seats, until the sergeant left and the officer turned to her.

"Colonel James Hasbrook," he shouted above the wind and the engines. "I'm running this show. You the spook?"

"Yes. Lottie Deno." She pulled a mittened hand out of her parka and shook his.

"Any military experience?"

"No."

"Been in a chopper?"

"No."

"Get sick easily?"

She shook her head. "I'm wearing one of those earpatch things."

He glanced at his watch. "Okay. We lift off when I get the next weather report. Cold does strange things to the equipment. All ours is rated to thirty below zero. We hit the camp eighty-two minutes from lift off. Stay in the chopper until the area is secured. I'll tell you when that is. Then find your man and bring him back to this chopper. We'll fly to back to Fort Wainright for debriefing."

She shook her head. "This guy belongs to the Company and they don't want him talking to anyone except his case officer, Colonel. Which right now is me. As soon as we get back to Fort Wainright we fly right back to Washington. I've got military ID for him, if we need it to cut through the red tape."

"Damned if I care." He paused. "Not supposed to be there, is he?"

"It's sort of an ambiguous situation."

"I'll see that he's not questioned."

The noise level on the tarmac increased. Lottie looked out, watching the starting carts pull away from the other helicopters. There were six helicopters all together. Three of then were fat but streamlined, with curved sponsoons on each side, and twin miniguns mounted up front. A refueling probe extended from the nose. "I thought you guys used Blackhawks."

"We use MH-92s up here. Smaller heat signature than the MH-60. In this cold the IR really stands out. Plus each is equipped with ALQ-144 infared countermeasures."

Lottie watched the men board the helicopters. Although the

6th division was not a Ranger unit, she had been told that many of its troops were Ranger qualified, with special training in ice climbing and Arctic survival. They were carrying M16 rifles, with the barrels pointed at the ground, and the trigger guards folded back so they could be fired with gloved hands. Hooked into their flak vests were grenades, and plastic flex cuffs for securing prisoners. It didn't seem like a whole lot of men. "Is this enough?"

Hasbrook grinned through clenched teeth. "This is more than enough. Your intelligence says this is an unarmed drill camp, and our scouts confirm that. We have them under observation right now and we've seen no sign of weapons. The three Redhawks hold twenty troops each. One of the Super Stallions holds a medical unit, the other is to remove the prisoners, plus evacuate the scouts. The other Little Bird has miniguns and rockets, that's to make sure everyone keeps their heads down. And we've got a Command and Communications aircraft, that's the one you're sitting in right now. We're fairly confident that we can overcome a small group of roughnecks. But you never know when some idiot will cut loose with a hunting rifle, so stay in the chopper."

"They have an armed security guard."

"Shit. We weren't told that. Just one?"

Lottie nodded.

"Wears a uniform? Identifiable?"

"Dark blue parka with security guard insignia."

Hasbrook spoke to the communications officer, who spoke into the radio. He turned back to her. "We'll find him. I hope he's not the hero type. If he is, he's going to have a lonely death. The closest force the Canadians have is seventy men at Yellowknife, and that's down by Great Slave Lake."

"Unless a Russian sub pops up and dumps a platoon of Spetnatz."

"We thought of that too. We've got a brace of 688 class attack submarines patrolling beneath us. Everything else is being pulled back."

The possibility that Russia or Canada might defend the drilling operation couldn't be dismissed, which is why America was making an armed response in the first place. More worrisome was that some other group might try to seize the hydrogen bombs. Lottie shivered in her parka.

"Twenty four below zero," said Hasbrook, reading from a sheet of paper. "Okay, we fly."

# # #

"Try them again, Jan."

"I just did try them, Mr. Rais." The pilot of the SC7 Skyvan pulled his headset off his ears. "They must still be maintaining radio silence. They'll do that if they're working with explosives."

Rais gritted his teeth with impatience. He had waited too long, trying to find a secure phone, and by the time he found one St. Vincent was out of contact. Rais had no choice but to fly in himself. He looked out the Skyvan's side windows, trying to see above and behind the plane. All he saw was sky and ice. "Any sign of American activity?"

"If they're out there, Mr. Rais, we won't see them until they're ready for us to see them."

"You think they will have air support?"

"Hell yes, they'll have air support. Yanks don't do anything until they control the air."

"But they haven't turned us back yet?"

"They won't, until they're about to move in. They don't want to tip their hand, you see. Once the shooting starts, they'll chase off anyone who gets within, oh, sixty kilometers of the place. But if they're not ready, they'll let us go right in. They'd rather let us land and shoot us on the ground anyway."

Jan had flown CF-18A Hornets for the Canadian Air Force. Rais trusted his judgement. He looked down. There were patches of clear, flat ice below them, and the Skyvan was an STOL, with short take off and landing capability. Rais made a decision.

He left the cockpit and went back to the boxy cabin of the Skyvan. He looked at the pile of gear that he had hurriedly

thrown together, and removed a pair of cross country skis, inspecting the bindings carefully. He checked his Webley and put it in the outside pocket of his parka, then put the parka on. In the other outside pocket he put a Magellan handheld GPS. Finally he opened a gray plastic case. It held the Mossberg police shotgun that he kept in his car. There was a variety of 12 gauge ammo for it, buckshot, dye marker, flare shells, tear gas shells, rubber stun shells. There were also RDX shells, meant for penetrating walls and barricades. He grabbed a handful of each type and stuffed them into his pockets. Then he went back up to the cockpit.

"Jan," he told the pilot. "If we get within twenty kilometers without being challenged, I want you to set down on the ice and let me off. Then take off immediately and continue to the platform, unless they turn you back."

The pilot turn his head long enough to see Rais's grim face. "Whatever you say, Mr. Rais."

# # #

Borski was on edge. Every ten minutes or so he would leave the enclosed area of the drilling deck to go out and look at the sky. Several times went back to the ekranoplane to check on the the electronics. Then he would come back to watch the final cylinder being loaded.

St. Vincent was getting irritated. Most of the workmen were not in on the scheme. The roustabouts loading the bomb still thought they were engaged in a massive, complex, hydrosonic mapping project, using advanced Soviet technology. It was hardly reassuring to see their Russian adviser looking so nervous just before he was due to set off explosive charges.

He watched Borski climb the ladder back up to the platform. The wind was picking up and it blew the hood back from his head. "Anton," St. Vincent said. "Why don't you go to the canteen and have a cup of tea?"

"We are being watched," said Borski. He stood in the doorway, looking out.

St. Vincent looked over his shoulder. "I don't see anything."

"My instincts tell me so. I can feel them."

St. Vincent could not feel anything except cold. He turned back to the drilling deck. Using a chain hoist, the cylinder was being lowered into a stainless steel frame, and wireguide pulleys attached it to a stout cable. The frame fitted precisely into a long length of large diameter casing that extended down through the ice island and into the water below. From its end, the cable dropped another two thousand meters.

"I still think we should have given them more time," said Borski. "Six hours. Will it be enough?"

"Anton, modern subs are very fast. They have top speeds in excess of sixty knots. They have plenty of time, don't worry." St. Vincent did not tell Borski that CORE had never released a warning to shipping. They both would have been surprised to learn that the Arctic was being cleared of shipping anyway; the State department had reported its findings to NATO, which had issued the warning.

"What about fishing boats?"

"What fishing boats? It is winter. They are all snug in their harbors, or they have moved south." St. Vincent abruptly changed the subject. "We have a Skyvan coming in to take off the men. Everything else we will abandon. It is a shame we'll lose the rig, but there simply isn't time to move it."

Borski watched them. A thick, rubber coated cable, the floating antenna, was being screwed into the top of the cylinder. Even when uncoiled, however, the tip of the antenna would still be beneath the ice, and the whole package would be completely undetectable from the surface.

"Will your crew be suspicious of losing the rig?"

"They won't know it. They are at the end of their contracts anyway, they think we will be bringing in a new crew."

"I will start the program when the area is cleared. It will set the timers and sequence the explosions. It calculates the optimum sequence for shock wave and heat distribution. All the sensors are built into the cylinders. It is a very clever program."

"Very clever," St. Vincent agreed. The software based its calculations on the contours of the sea bottom, the depth of the water, the temperature, the density, and the salinity. The sea topography was programmed in, the other information was relayed from the sensors on the bombs. "It was your friends in Kaliningrad who wrote the program?"

"Zelenograd." Borski replied after some hesitation. Until recently, both Kaliningrad and Zelenograd had been secret cities, closed to outsiders and omitted from official maps. Older Russians still found it difficult to speak of them openly. "Everyone thinks of Kaliningrad because Maris Multimedia is there, but if you want to find a computer expert — what your country calls a hacker — you go to Zelenograd. A lot of my students ended up there. It is a very nice city, all new apartment buildings, with many parks. We call it the Green City."

"Here we go." The pins holding the cylinder frame were pulled out and, with a quiet scraping sound, the cylinder assembly disappeared into the hole in the ice. St. Vincent and Borski watched the antenna cable unwind from its drum.

"And that is the last one," said St. Vincent. "I almost feel like we should have broken a bottle of champagne over it."

"We will celebrate afterwards."

"Yes." St. Vincent walked out on to the deck, where a freshening wind cut through his unzipped parka. "The air is so clean here. When I go back to Quebec City I feel like I am breathing soup."

"The Arabs say that busy men develop an affection for desolate places."

"Do you ever feel like you will miss the ice?"

Borski had a momentary vision of an oil platform, crushed by ice flows and bursting into flame. "No." He shook his head. "I won't miss it at all."

# # #

Lottie looked down at the ice rushing beneath her. It was fascinating stuff. In front, they raced toward long, sharply

defined pressure ridges, wind rounded hummocks, and great rectangular blocks protruding from the flat plain. Beneath them, the ice flashed past in a blur of white and aquamarine. She put on a helmet and plugged in the jack to the intercom system. "This is pretty damn fast."

"About 140 kilometers," said Hasbrook. "Not so fast." He was not flying (although he was qualified), but he remained in the copilot's seat and watched the instrument panel, where a battery of electronics fed the heads-up display. The copilot's panel was identical to the pilot's, except that the pilot's also had a CRT that provided moving map data and Forward Looking Infrared imagery. Somewhere out there, Lottie knew, was an E3A Sentry with AWACs capability, and Hasbrook, the pilot, and the communications officer had been jammering with it constantly since the MH-6 took off.

"Why are we flying so low?"

"This isn't particularly low. But we don't want to give them any more warning than we have to."

Lottie searched the instrument panel for the Radar Warning Receiver but couldn't find it. "It's a drilling rig. It doesn't have radar."

"Maybe not. The Sentry didn't pick any up. Just the usual drilling platform transponder. But they're flying aircraft in and out and the aircraft will have weather radar at least and who knows what else. Avionics packages are cheap these days. So we stay low." Hasbrook pointed out the top of the cockpit dome. "Don't look down, look up." He grinned.

Lottie looked up. The Arctic sky was clear and blue, with only a few shreds of cirrus clouds in the upper atmosphere. After a minute of searching she found it. High above them she saw a silver object. It held a distinctive silouette — four massive turboprops mounted on swept back wings. "What is it?"

"A Tupelov TU-142."

"A Bear bomber?"

"They don't use them as bombers much anymore. They tend to load them up with electronics and use them as spy planes."

"Will it give us trouble?"

"This guy won't. We're sending up a couple of Lawn Darts to make sure he stays out of our hair. Question is, is he on his own, or is he the advance man for another show?"

Lottie thought about this, while looking out the windows at the other helicopters. The AH-6 was in front of them, and the three troop carriers were strung out to the side. The Super Stallions followed.

"The Russians know we're mounting an operation, right? Their satellites would monitor activity at Fort Wainright."

"Yeah, especially since we pulled our submarines out in a hurry. They might just send this guy to watch the action." Hasbrook spoke to the pilot. "How long to refuel?"

"Twenty minutes," said the pilot, without turning his head.

Hasbrook nodded. He waved his hand at the top of the cockpit. "Looks like we're going to have an audience."

# # #

"Who's this?" said Lebroux. "We got company."

Two F-16 Fighting Falcons were coming up fast on the Ishida. Archie Baldwin was in the co-pilot's seat. He looked up in time to see the single engined fighters streak by, close enough to see the pilot's helmets in the cockpits, close enough for the wash from the jets to rock the turboprop. Air-to-air missiles protruded from the wingtips.

"Electric jets." Fighting Falcons had advanced avionics for low level navigation and night attack. He wasn't surprised to find them used in a region where the nights lasted six months. Baldwin looked around and saw nothing but empty ice cap. Where were the jets going?

"They call them Lawn Darts," said Lebroux.

"Awfully close, weren't they?"

"Fighter pilots are all jerks."

Ray Alexander said, "They're coming back."

Still keeping formation with each other, the fighters made a wide circle and came up alongside the VTOL again, each throttling back to match its speed. A smooth, baritone voice

came over the radio. "Ishida, you are entering restricted airspace. You are requested to return Qaanaaq immediately."

"Say what!" said Lebroux.

"What the hell?" said Baldwin, almost at the same time. He touched his headset microphone. "This is Ishida. We are on a business trip in international airspace. I'm afraid you chaps are rather out of your jurisdiction."

"Understood, Ishida, but we have maneuvers in this area. Please return to Qaanaaq until the situation is clear. This is for your own safety."

"Tough shit," said Lebroux. "Who made them king of the airways?" He switched on his mike. "Sorry, but this is urgent business. You'll just have to maneuver around us."

There was no reply from the fighter. He looked sideways to see the two jets withdraw. "Ha! Arrogant bastards probably aren't used to having someone stand up to them."

"They must have thought we were someone else. Part of their games, perhaps."

The radar screen lit up. "Jesus Christ!"

"What!"

"They just put their target acquisition radar on us!" Lebroux threw the VTOL into a tight bank and abruptly changed course.

"Ishida, this is your final warning. Please return to . . ."

"Yes, yes," interrupted Baldwin. "You've made your point. We're on our way."

"Have a safe flight, Ishida."

"Bloody hell," said Alexander. "What was that all about?"

"I've no idea. This is damned inconvenient. Can we radio Aldershot and set up a new rendezvous?"

"Not right now," said Lebroux. He was scanning the channels on the radio. "We're being jammed. There must be an AWACS around."

"God damn it all to hell. I'm going to have the embassy put in a complaint."

"Can't," said Alexander. "We're not supposed to be here,

remember? Lowry won't want any publicity."

"Lowry will not be pleased if Aldershot puts into port with those nanites still active."

"I don't see we have much choice. We have an old saying in my family; "Never argue with a man who is pointing an AMRAAM missile at your head.""

"We have the same saying in my family," said Lebroux. "Christ, when their radar acquired us I felt like I was looking down the barrel of a loaded gun."

"They didn't aquire us," Baldwin said irritably. "Their target radar won't show up on our collision radar. That was some trick of their ECM."

"Good trick. Totally convinced me. You want to challenge him, you can do it in your Citation."

Baldwin brooded in silence all the way back to Qaanaaq.

# # #

Surfacing through the ice, while well within the capabilities of the Aldershot, was not a maneuver it was designed to do regularly, and was by no means a trivial operation for a vessel that large. Thompsen ordered a complete systems check while they were waiting for their rendezvous time. If the pack shifted and the polyna started to close, he wanted nothing to prevent the sub from making a quick descent. Over the speaker system the engineering officers announced each item resolved as they went through their check lists, and Second Officer Shelly, on the bridge, was logging them and noting the time. Thompsen was following the progress of the boiler feedwater pumps and turbines on another monitor, watching the sharp green spikes of the vibration meters, that would give the first warning if anything was wrong.

First Officer Davis was minding the navigation console. Two separate screens showed displays from the Submarine Inertial Navigation System and the Ship's Navigation Automatic Plotting System. They were formally known by their official acronyms of SINS and SNAPS, but more frequently referred to as Sammy and Sally. The radar screen was blank now, since

the radar mast was lowered, but the sonar displays were all active, building up false color images of the ice above and the ocean floor beneath them. Davis suddenly said, "Look at that!"

Shelly and Thompsen together said, "What?" They turned their attention to the navigation comm.

"We've picked up a boomer. But look at the sonar track. This bloke is really tearing along."

Thompsen looked at the data display. Boomers usually cruised at five to fifteen knots. The 594 class missile sub was moving at thirty-two knots and still accelerating. He said, "Put it on the speaker."

Davis moved the trackball and clicked it, and the hydrophones filled the bridge with sound, the thrumming of the submarine's turbines, the rumbling of the screws, and hiss of compressed air sparged behind the screws to conceal cavitation noise. Thompsen listened for a minute and said, "Well, his engines sound all right. Perhaps he's doing a load test."

"Perhaps war has broken out," said Shelly. "And he's racing for the edge of the pack to blow his tubes." He meant this as a joke, but it didn't come off.

"Maybe that is true," said Takanasha.

Davis shook his head. "They launch missiles right through the ice now. My guess is that he received a distress call on an ELF and he's going to help out."

"You don't think he's just on maneuvers?"

"A boomer hides on maneuvers, and the hunter-killers try to find him. This chap doesn't care if anyone knows where he is."

"Do we float the antennae and listen for a distress call?"

"I don't think that will be necessary." Thompsen had thought this over. "We'll be surfacing shortly anyway. Mr. Davis, now is the time to find that polyna again. We can break through a bit early and take a listen."

Davis keyed the request into the navcomm. It was not a problem, the SNAPS would bring them right under the polyna. It was times like this that he thought Thompsen should have

gone into the Navy instead of merchant service. The downfall of missile submarine skippers was that they had to know what was going on outside the hull. It led them to take unnecessary peeks through the periscope, or send up the antenna, and risk giving away their presence when they should have been sitting tight and keeping quiet. Whereas Thompsen, who had no need for secrecy, was satisfied to watch the data come in on his displays and leave the periscope alone. He would have done well in the Royal Navy.

"In any case," continued Thompsen. "It will be a good opportunity for a topside inspection."

Then again, perhaps not. Davis said, "I'll keep my eyes open, sir."

# # #

"The Arctic is warming up already," said St. Vincent. "Air pollution, the greenhouse effect, that sort of thing. It doesn't show up in the ice cover yet, but the Little Auks are migrating farther north. That's how you can tell."

"Global warming is a problem," Borski agreed absently, and without a trace of irony in his voice. "If the South Polar ice cap melts . . . what was that?"

Far off the end of the airstrip he caught a glimpse of white movement, a man in a snowsuit. He squinted into the twilight. At the same time the wind brought a faint chopping noise. It was the moment he had been waiting for, the moment he had feared. "They're here," he shouted, and ran.

Helicopters are so common in the oil fields that few of the workers even raised their heads when Hasbrook's force came in. But Daily was waiting for something to happen also, and keeping a close eye on the ekranoplane. He had been working on the Goodwin Interceptor, and was just topping off the tanks of the Rotax engine with oil and gasoline, when he heard the helicopters. Automatically he looked toward the airstrip, where Borski and St. Vincent were standing on the wing of the ekranoplane. The two men reacted swiftly. After exchanging only a few words, Borski disappeared into the plane, while St.

Vincent clambered off the wing and ran for his own plane, a Twin Otter 300.

The nose-mounted turbofans of the ekranoplane started to spin, the exhaust sending a blast of ice particles and granular snow into the air. "Damn it!" Daily said, and climbed into the tiny hovercraft, grabbing the pistol grip control stick. The top was off and the cockpit was open. The Kevlar propeller spun up at once, he squeezed the throttle, and the Interceptor rose off its skidplates and headed across the camp.

The Goodwin Interceptor can reach seventy miles per hour across ice, but because it rides on a frictionless bank of air, it has no real traction to keep it on course. Daily came in under the Orlyanok's wing just as the turbofans revved into action and sudden exhaust blew the hovercraft backwards and spun it around. The ekranoplane lifted itself from the ice. He dropped back from the plane and opened the throttle wide, this time coming directly from the rear, knowing he had only a few seconds before the ekranoplane outran him. They left the airstrip behind. The two stroke engine screamed.

He risked a glance at the airstrip. The DeHavilland was spinning up its engines. Suddenly an AH-6 appeared and laid down a line of bullets from its minigun, chopping up the ice in front of the Twin Otter. Its engines stopped.

Daily looked forward and was engulfed in condensation fog. For a moment he was blind, tunneling through a white wall at top speed. The fog cleared and he found himself under the rising plane, staring at the still lowered cargo ramp.

He gave the throttle one final squeeze, stood up on the seat, and grabbed the ramp with both hands. The Interceptor dropped away behind him, disappearing into the fog and distance. The Orlyanok became airborne. Daily found himself hanging from the ramp, twenty-five feet above the speeding ice.

"Fuck!" he screeched and hauled himself up with one convulsive jerk of his arms. His parka caught on a latch, leaving him stuck half on and half over the ramp, legs kicking

uselessly in the air, the slipstream pulling him back. He dug his fingers into the plastic grill covering the ramp's top. Above him, in the cargo bay, he could see Borski typing frantically into the computer.

"Fuck," he said again. Borski heard him above the roar and the wind and engines and jumped out of his seat. Turning around, his hand came out of his pocket holding a small stainless steel pistol. He pointed it at Daily, saw his predictament, and took a step towards him. Then he hesitated and looked back at the computer.

Daily swung from side to side, trying to work his parka free, without losing his grip. Borski made up his mind. He sat back down again at the computer.

Daily tried to reach for the latch, but found he couldn't hold on with only one arm. His gloved hands were losing strength. Instead he pulled forward with all his strength and the parka made a tearing sound. He gave a mirthless grin of relief, thinking he had freed himself. Then he slipped backwards.

# # #

Hasbrook turned to Lottie. "We got confirmation on that VTOL we chased off. Turns out it's being leased by P&O shipping. Any connection with our guys here?"

Lottie shook her head. "Not that I know of."

"Okay," said Hasbrook. "Here we go."

The attack happened so fast and in so many ways at once that Lottie could only grasp it in a series of jagged, disjointed images, as though the scenery was lit by a nightclub strobe light. The helicopters came in low and fast, and the camp seemed to expand before her eyes, filling her vision. Men in thick coveralls and work boots stared at them, open mouthed. Then the AH-6 strafed a line of bullets down the center of the camp and the workers dove into the ice, their arms over their heads.

"Smart guys," said Hasbrook approvingly.

The first Redhawk hovered over the platform, three hatches on each side of the fuselage bristling with infantry. The next

moment it was empty, twenty soldiers slithering down on fast ropes and disappearing into the rig. The helicopter pulled away and circled the platform, covering it with its miniguns.

The RIO said, "Sir, the ground effects plane has taken off."

"Is it armed?"

"No sir."

"Leave it for now. Secure the airstrip."

A Twin Otter was beginning to taxi down the runway. The Little Bird faced it with a burst of machine gun fire and it stopped. A Redhawk set down on the runway, blocking it, and the soldiers poured out and swarmed over the plane. The third helicopter set down near the canteen, and the soldiers fanned out and immediately separated, two or three to each building, taking up defensive positions near the walls and corners. There was no opposing fire and a moment later they were kicking open the doors and, to Lottie's horror, tossing in grenades.

She gasped. There was a series of BAM BAM BAMS from inside the buildings, audible even above the roar of the choppers. Hasbrook pushed his microphone away from his mouth.

"Flash bangs," he told her. "Stun grenades."

"Oh," Lottie said.

And that seemed to be that. The first helicopter set down on the platform and Hasbrook's chopper set down on the ice. The AH-6 continued to circle. Various men were escorted out of the buildings, their hands secured behind their backs with flexcuffs. The Eskimo Scouts began filtering in from the perimeter. Hasbrook spent a few more minutes jammering on the radio. There was some discussion about whether the security guard had been found. It was confirmed that he had been found and disarmed. Satisfied, he turned to Lottie again. "No casualties. That's the way I like it."

"Great."

"The base is secure. Let's find your bombs."

# # #

Nothing drains a man strength as fast as intense cold. The

icy air cut right through Daily's insulated gloves and he felt his fingers grow numb. The ramp was equipped with rollers for loading cargo, and these were what he wrapped his hands around now, trying to keep his grip on the smooth metal pins that wanted to spin beneath his palms. One hand slipped loose and he flailed it madly over the ramp before he got it down and gripped the roller again. His legs kicked, churning air, in a still futile effort to pull himself any farther up the ramp. "Oh Jesus God," he said despairingly. He was only twenty feet off the ground but the ekranoplane was going over a hundred miles per hour now and still accelerating. His hands slipped again and he grabbed another roller.

Borski typed a final sequence of numbers and hit the return key. The screen flickered briefly, a few terse lines announcing the program had run and the detonation sequence had been set. He gave a satisfied grunt, shoved the pistol back in his pocket, and hurried to help the man on the ramp.

He quickly tied a nylon hold-down strap around his waist and then let himself carefully down the ramp, putting his feet between the rollers. Near the end he lay down on his stomach and grabbed Daily's shoulders. With Borski holding him up, Daily was able to wriggle sideways and free his parka, then he let the Russian drag him up the ramp. He lay on his back, gasping for breath. Borski pressed the switch to raise the ramp and the door whined shut, blocking out the roar of the engines and the wind. He squatted beside Daily. "Well, that was very brave. Very James Bondish."

"Yeah? I feel more like Maxwell Smart."

"I am impressed by your dedication."

"Thanks." Daily took one more deep breath, and then brought his arm up and punched Borski in the center of the face. His thick gloves prevented him from doing any real damage, but the Russian was stunned. He sat down on his backside in silent surprise, sucking in his breath, and Daily rolled over on top of him. This was followed by a solid minute of incompetent wrestling and grunting, two middle-aged, out of

shape men floundering about on an icy floor, trying to punch each other through thick parkas, until eventually Daily managed to sit on Borski's chest and take the pistol from his pocket. He put it to Borski's head, then brought it up to his own face and looked at it closely. "Where the hell did you get this?" It was a .25 caliber Heckler and Koch K4.

"Detroit," Borski said, almost apologetically. "Actually, I bought it for my mother. The crime in Moscow — these days." He spread his hands.

"You should get her something with more knockdown power." Daily knew this was a stupid thing to say but now that he was on the plane, he wasn't sure what to do next. "This little popgun isn't going to stop anybody."

"It has to be small enough to fit in her purse," said Borski, also feeling stupid.

"Well, that's true."

This conversation seemed to have run its course. Daily decided to start over. "Okay, about these bombs. Where are they?"

"You are too late. They are armed and the detonation sequence has begun. They cannot be stopped."

"Bullshit."

"This is the truth. The bombs will go off and nothing can stop them. You can be certain that otherwise I would not have helped you. Now if you let me up we should warn the others."

They both stood up. Keeping the gun centered on Borski, Daily backed up to the transmission equipment and pulled loose all the power cables. He looked at the Russian, who merely shrugged. "The devices have their own timers and detonation control. The computer merely sets the sequence for the explosions and it is already set."

"We have bomb disposal experts."

Borski smiled complacently. "The map beside you shows the locations. Your bomb disposal experts are welcome to try. The devices are deep beneath the ocean and the ice cap. They will not have time to retrieve them, much less disarm them."

He said this with such calm assurance that Daily was sure he was being told the truth. He gritted his teeth in frustration.

Borski brushed past him, ignoring the pistol, and went up to the cabin. After a moment, Daily followed. The pilot seemed very cheerful and not the least surprised to see Borski followed by a gun toting American. He said, in Russian, "They want us to set a course for Point Barrow. They'll escort us."

Borski looked out the window, but the platform and camp were already out of sight. "Have you responded yet?"

"No."

"Then stall them. Speak to them in French and do not identify yourself. Tell them you are on a business trip. It is only helicopters. We can outrun them."

"They have Falcons. We can not outrun them if they try to follow us. But they will not follow us. They say they will send interceptors from Elmendorf."

"Oh yes?" Borski pondered this. Stolchave checked the input from the surface scanning Doppler radar while he waited.

"Well, it does not matter so much. Very well, let us go to Point Barrow." Borski smiled broadly. "It is too late now and at last Russia will have ice free ports." Then he looked concerned. "But let us see if we should return and help with the evacuation."

# # #

All three Redhawks were on the ice now, their engines still running, but the blades disengaged and no longer spinning. The hatches had been shut to keep out the wind and only the rear ramps were open. Lottie scooted herself inside one and looked around. "Excuse me. Has anyone seen a man named Mike Daily?"

About half of the Lisa's twenty-two workers were inside, seated on the padded metal benches that ran down either side of the chopper's interior. They looked at her in silence.

An Arctic oil field worker who has been in the business more than a few years gets used to unexpected delays. Bad weather, held-up deliveries, equipment breakdowns, management screw-

ups, environmental permits, and more bad weather, can delay a project for days, weeks, or even months. The workers, who are paid by the hour or by the day, learn to take these things in stride. Nonetheless, facing the wrong end of an M16 rifle is an unsettling experience for even the calmest of men. All of them were thoroughly confused about what was going on, some of them were quite a bit angry. A few conversed with each other in French, the rest were silent and sullen. Michael St. Vincent was sitting with his legs drawn up and his arms wrapped about his knees, staring thoughtfully into space. He ignored her.

Chatterjack came in, escorted by two infantry. One had taken his rifle away from him. The other was saying, "Yeah, he was wearing a survival suit, of course, but that's only good for fifteen, maybe twenty minutes when you're in water that cold. By the time the Sea Stallion got there and fished him out, he was dead."

Chatterjack nodded. "Hypothermia. Happens all the time. A buddy of mine . . ."

Lottie interrupted. "Excuse me. I'm doing a head count, making sure no one is injured or missing. Have you seen Mike Daily?"

"Sure," said Chatterjack. "He's back by the snowmobile shed. At least he was before the fireworks started. That's the orange one at the far end of the camp." He turned back to his captors. "Yeah, a buddy of mine froze out on his fishing boat . . ."

"Thank you," Lottie said, and took off.

Another soldier leaned into the cabin and pulled down his snow goggles. "Okay, who is the main man running this show?"

Seven of the silent rig workers immediately looked at St. Vincent. He sat up tiredly and put down his feet. "I am."

"Walk this way, man. Colonel wants to see you.

# # #

St. Vincent said, "Colonel, you have committed an illegal act of aggression against unarmed citizens of a peaceful nation."

"Oh, for Christ's sake," said Hasbrook. "Another fucking lawyer. You've got *hydrogen bombs*. You call that unarmed?"

"Um, well, they're not bombs really, they're devices."

St. Vincent wanted nothing more than to go to sleep. This is a typical reaction to severe depression, the stunning trauma of having years of work suddenly go up in smoke, but he didn't, at his moment, consider himself depressed. He just thought he was tired from too much work, and stress, and now that it was over, he wanted to rest. Until a few minutes ago he clung to the hope that the project could still go off, that the Americans were just winging it. But they seemed tremendously well organized and informed. Beneath his thick parka he hunched his shoulders miserably and thought, "Anton was right. They've known about us for months. It was sheer luck that we got this far."

He looked past Hasbrook, out the front windshield. His men were being loaded into the helicopters by a half dozen armed soldiers. He expected they would be flown to Alaska. Possibly Greenland, but the Americans could do more on their own territory.

Then the RIO said, "Sir, I'm in contact with the Soviet aircraft. He says the bombs are armed and about to go off."

At once St. Vincent's fatigue disappeared. He wanted to jump with joy, but the presence of tense soldiers with M16s kept him in his seat. He said, "Anton must have initiated the firing sequence after all," and made no attempt to disguise the glee in his voice.

Hasbrook looked at him. "Anton is the commie? I mean, the Russian?"

"Yes."

"Where are the bombs?"

"They are all over the ice cap, but the important thing is that there is one right underneath us, and it may go off at any moment. So I suggest we take off immediately."

"Bullshit."

"You think we are bluffing? True, I am a businessman. I

might bluff. Anton would not."

"Then I suggest," Hasbrook said, "that you disarm that bomb."

"I can't do that."

"Sir, there is an American agent on board the aircraft. He says he saw the bombs being placed and believes they are armed."

Hasbrook took a 9mm Beretta from under his parka and pointed it meaningfully at St. Vincent. "You better goddamn well try."

St. Vincent gave him a condescending look. "Colonel, if I'm willing to let myself be destroyed by a hydrogen bomb explosion, I should hardly worry about a bullet. I have a strong desire to see this thing through, but even if I didn't, I have no idea how to disarm the bombs, or even if they can be disarmed. Anton insisted that they remain under his control."

"How long till this one goes off?"

"Not long. A matter of minutes."

"The Russian can disarm them?"

St. Vincent smiled. "He won't."

"We'll see." Hasbrook turned to his communications officer. "Tell everyone we're taking off. Tell everyone to get into their aircraft and take off *right now*."

# # #

Lottie was frustrated. The two hour ride in the helicopter had left her cold and stiff, despite her ski suit. Her sheepskin boots, reinforced with a pair of wool socks, were still inadequate for the Arctic and now her feet were completely chilled. When the task force landed, she had first waited in the chopper, thinking Daily would be brought out with the rest of the drilling crew. Then she had quickly gone through the platform and the bunkhouse, before she had been directed to the snowmobile shed. She was colder than she had ever been in her life, and when she trudged across the camp, still carrying her giant handbag, and Daily was still nowhere to be found, she began to get upset. "I've lost him," she thought. "I've lost an

entire man. This is not the kind of thing that looks good on a performance review." She closed the shed door and sat down on a Ski-doo. "I wonder if a polar bear ate him." For a moment it seemed as though the sound of the helicopters had increased, but the wind shifted and carried the noise away.

She stood up and stamped her feet to keep the circulation going, then sat back down, opened her handbag and pulled out a package of Ringdings. They were frozen solid, but she peeled off the wrapper, which was brittle from cold, and crunched them anyway. The sugar boosted her spirits. Probably Daily had just left the camp with an earlier shift out. He should have checked in with her, and saved her from the miserable flight. Or maybe he did check in but she was already in transit. She could find out. The RIO could give her a link to AUTOVON, the Defense Department long distance telephone system.

She stood up again and pulled open the shed door. The wind grabbed it and slammed her back, sending a swirling cloud of snow and smoke into the shed. Lottie forced the door open and held it this time. The whole camp was enveloped in fog and whipped up snow, obscuring even the rig itself. She waited. In a few moments the wind had cleared the fog away, the snow settled, and she saw that the helicopters were all gone.

It took a few moments for the realization to sink in. Then she saw them airborne, heading back towards Point Barrow. She was being abandoned on the Arctic ice cap, a million miles from nowhere. "Wait! Wait for me!" she wailed, running across the camp. They kept going. She stopped in the middle of the camp and watched the helicopters grow smaller. "Fuck!"

# # #

Borski looked at his watch. "It will not be long until they explode. We should circle and climb. This will be a very great sight."

"I guess a few minutes won't hurt," said Daily. He stifled the urge to laugh. Only an hour ago he had been convinced that he was on the track of a joint Russian-Canadian terrorist group, psycho lunatics running a complex plot to smuggle hydrogen

bombs over the pole and into the populated south, perhaps to hold cities for ransom and all that spy stuff. Now it turned out that they had hydrogen bombs all right, but they were just setting them off in the middle of the ocean. Why? Who cared?

He put Borski's H&K into his pocket and followed the man back up to the cockpit. The drill camp was dead ahead. He watched it loom larger as they approached.

The pilot pulled his headset off one ear. "The Americans have taken off in MH-92s. Our Canadian comrades are being flown out, under guard in the same helicopters. The Skyvan was turned away. They have left the DeHavilland behind. That is a shame. They are fine aircraft. Oh, and the Americans say they are one person short."

"I see where your priorities lie," said Borski. He translated this last bit for Daily's benefit.

"They think she is still at the drilling camp," finished Stolchave.

"She?" said Daily, after the translation.

"Yes, there she is." Borski pointed through the windscreen. A women in fashionable brown boots was trudging tiredly against the wind, white coveralls unzipped to reveal a neon ski suit.

"It is no problem. Tell them we will land and get her, then take her to Point Barrow."

Stolchave looked worried. "Isn't this bomb supposed to go off now?"

"Oh no," said Borski. "This will be the last one to detonate. Plenty of time."

The pilot brought the ekranoplane to the edge of the runway, all but killing the tail mounted turboprop, and raising the thrust on the nose mounted turbofans. The ekranoplane was now essentially operating like a hovercraft, drifting slowly across the camp. The woman stopped and stared at them. Daily lowered the cargo ramp.

He ran down and grabbed her arm. "Let's go!"

"Mike! Where have you been?"

"Come on! This place is going to blow any second!" He dragged her back up the cargo ramp and raised it. Almost immediately the Stolchave put on speed and took the plane way from the camp. Daily showed her the mass of electronics, while Borski watched with calm amusement. "That's the key to whatever they're up to. Can you get into it?"

"I don't believe it!" Lottie stared at the computer. "It's an IBM 360!"

"No," said Borski. "She cannot get into it."

"It's a what?"

It was not exactly an IBM S360, as Lottie well knew, but a close copy of it, built and sold under the name CM RUSSIA. They were still in wide use throughout the former Soviet republics.

"They built thousands of them," said Lottie. "Hell, tens of thousands." She already had her palmtop out of her handbag and was fitting connectors to it. "Let's see if they screwed up the same way. This should only take a minute."

"Who is this?" said Borski. He stepped forward

In a flash Daily had the gun out again. "Back off, Jack."

Borski stopped. "It does not matter," he said. "The programs are password protected."

"Yep," said Lottie. "Happens all the time. These computers are shipped with a root password. Usually it's the same for all models. The technicians who install the computers use the root password to set up the operating system. Then when they leave, the system operator is supposed to change the root password. But a hell of a lot of the time, that never gets done." She was already typing rapidly.

The CM calculated the optimum detonation sequence for the bombs and set the timers on them by remote control. For safety, it allowed an interval time for the blasting foreman to clear the area or revise the schedule. It now occurred to Borski that he should have destroyed the computer once the schedule was transmitted. It would have prevented Lottie from canceling the detonation sequence. He looked at the gun in Daily's hand.

It was too late now.

"You are bluffing. I have been told many times the firing sequence cannot be canceled."

"Just shut up," Daily told him.

It also occurred to Borski that if he had not carried the gun, Daily would not now be pointing it at him. He groaned in despair.

"Please. You must not do this. Think of the starving peasants in Samarkand and Urgench."

"What?"

Lottie said, "The Quebecois and the Russians want to melt the North Pole and change global weather patterns."

"It will be a very great thing," said Borski. "Land barren for centuries will give forth life. Fishing will improve. The Amu Darya river will flow again. And that is just a small part of it. Ice bound ports will open. Oil . . ." He bit his lip.

"What will happen to America?" said Daily. "How about us?"

Borski hesitated. "America has too much farmland already. You have a thirty million acre surplus."

"Yeah, right," said Daily. "Just keep still."

"And here we go," said Lottie. The formerly blank screen was now filled with cyrillic letters. "IBM always used 'root' as the root password. Honeywell techs like to use 'pass.' CM used 'red.' I love guys with no imagination. Makes my life so much easier." She was rapidly reading files, flashing text across screen.

"Nyet!" screamed Borski. Before Daily could react he bolted for the cabin.

"What the hell!" Daily followed him. The cabin door slammed in his face, but he put his shoulder down to hit before it could latch and the door swung open before his weight. He stepped inside, but abruptly the plane took a lurch to the left, throwing Daily to the floor. He grabbed the co-pilot's chair and pulled himself to his knees. The ekranoplane dropped and bounced off the ice pack, with a scream of tearing metal. The jolt knocked Daily down again, then from beneath the co-pilot's

chair he saw Borski struggling with the pilot.

Both men had their hands on the control column. The plane was swerving across the pack ice in wide curves. One of the wings grazed a pressure ridge, a piece of sheet metal tore away with an explosive crack. "It must happen!" Borski nearly sobbed the words. "Ice free ports. Fields of wheat. Growing seasons."

"Let go!" snapped Stolchave.

Daily glimpsed mad flashes of ice bound scenery, jagged boulders and pressure ridges rushing at him through the windshield, and up ahead, the drilling platform. The plane had come around full circle. He braced himself against the chair and drew a bead on Borski's head with the H&K. The plane swerved and hit the ground again, throwing Daily forward. The H&K cracked three times. Daily saw the windshield behind Borski star.

Lottie lurched through the cabin door. She saw Daily with the gun in his hand and grabbed for his arm. "Stop that!" Outside, something massive and gray loomed in the plane's windshield.

# # #

Takanasha braced himself for an impact that never came, at least, as far as he could tell from inside the Aldershot. The computerized control systems of the submarine read the temperature and salinity of the seawater from an array of bathymetric sensors, calculated the precise density of the water and the buoyancy of the submarine, and brought it to a gentle rest against the underside of the ice pack. Positive buoyancy was gently increased until the ice cracked above the reinforced sail and slid aside in multi-ton chunks. None of this was apparent from the bridge, well insulated by its barriers of sound absorbing oil. Quietly the Aldershot rose above the Arctic plain. Takanasha couldn't feel a thing.

"Put up the surface radar and the radio mast, Mr. Shelly. See if you can raise Archie." Thompsen thumbed the handles on the Barr and Stroud search periscope. A moment later a

green LED lit on the enameled housing, indicating the periscope was raised.

"Let's have a look then." He put his face to the eyepiece and swung the periscope around. "Bloody hell!"

# # #

There was no time for the Stolchave to react, only a moment to stare in horror and then the plane hit the Aldershot's sail. The right wing tore completely away and the plane struck the ice with a series of shattering crunches, spinning in three complete circles before grinding to a halt, bit and pieces of fuselage flying off in all directions, coming finally to rest with its nose against an ice hummock.

Stolchave, who had been strapped into his seat, recovered first. He threw the switches to flood the engines with fire suppressing foam, took off his headset, unstrapped himself and took a deep breath. His chest hurt where the shoulder straps dug into it, but other than that he was fine. Borski was unconscious, but breathing. Hesitantly, the pilot decided not to move him. Lottie, who found herself cushioned against Daily, was already sitting up and Daily was beginning to stir. She took the pilot's outstretched hand and let herself be pulled up. She had a cut on her face and a large bruise was forming on her forehead. She said dazedly, "What did we hit?"

They both looked out the windshield, which was, amazingly enough, still intact. A large polyna had opened in the ice, and it was now filled with smooth, gray painted metal and the unmistakable shape of a conning tower.

Lottie answered her own question with disbelief. "A submarine?"

Mike Daily pulled himself to his feet, looked out at the sub, and said, "Well, I hope to hell he's got coverage." He sat down heavily in the copilot's chair.

Lottie put one hand over the cut on her face and went back to the cargo bay. She was gone for a few minutes, while Daily, concussed and disoriented, stared dully at Stolchave.

"Perhaps we should see if they are all right." said the pilot.

Daily was holding his head with both hands. "Fuck 'em. Let *them* see if *we're* all right."

"None of us are going to be all right if the bomb goes off," said Lottie. She came back to the cockpit, carrying her handbag. "The computer is undamaged, anyway. Mike, can you walk?"

"Yeah."

"Go out there and tell them they need to evacuate their submarine. You . . ." She spoke to the pilot. "What's your name, anyway?"

"Sergai."

"Sergai, I think you better get on the radio and call back some of those helicopters to get us. Real fast."

Stolchave was on the radio before she finished speaking.

Daily said, "You couldn't get into the computer?"

"Yes and no. You better get moving, Mike." She knelt down beside Borski and put her hand on his arm. "Anton?"

Borski opened his eyes.

"Anton, my name is Lottie Deno. I'm with the Office of Economic Intelligence."

"Ah." Borski closed his eyes. He opened them again. "Not the CIA, not the MVD. My nemesis is from the Office of *Economic* Intelligence. How very capitalistic." This all came out in a whisper.

Lottie had to smile. She said, "Anton, we're crashed only a few thousand yards from the drill platform. You have to give me the password. Or else we may all die."

"No," said Borski automatically. Then he sat bolt upright, wincing as pain stabbed through his head and chest. "You didn't stop the sequence?"

"No. The root password gives me access to the operating system, but the program itself requires a second password to desequence the bombs."

"This is bigger than my life," said Borski. "You can still fly off and save yourselves. Go ahead and leave me if you must. And you cannot decrypt that file. We do not use your Data

Encryptation Standard."

Lottie shrugged. "No-one does, anymore. Come on, Anton." She showed him her palmtop. "This computers has a cellular modem. Our command helicopter can give me a satellite link to Fort Meade. They can crack it by trial and error in a few minutes."

"Such cleverness." Borski slumped back against the wall. "Then you do not need my help." He felt very tired.

To decrypt a message one needs either the encryptation algorithm or the key. Given the key and a sufficient amount of decoded text, the programmer can reverse engineer the encryptation algorithm. Or, given the algorithm, the programmer can look for the key to repeat within the encrypted text. Modern security schemes get around this by using random number generators to produce very long keys, so that an enormous amount of text can be sent before the key repeats. It was unlikely that Borski's program would run long enough for the key to repeat.

But the engineers that Nataskovitch had assigned to the project did not know that they were designing a system to detonate nuclear weapons. They still thought it would be used for seismic testing, and they just wanted to keep stray fingers from causing trouble. So the sequencing program used a simple, fast algorithm to encrypt the signals to the bombs. Signals from other sources would be ignored.

So the solution could be found by plain, brute force computing. The NSA computers, custom built, enormously fast, would simply try a key and see if it worked. They could do this thousands of times per second.

Lottie hesitated, wondering how much information she should give away, and how much time she should waste trying to talk to Borski. "Each time I do a trial decryptation, I'll have to examine the output to decide if the decoding was successful. So each time the program will have to run through its calculations to produce the output. That will take a while. The bombs are set to go off in . . ."

"Twenty one minutes."

"Anton, I've read your file. I know about your friends being killed in that oil rig fire. Melting down the whole damn Arctic isn't going to bring them back."

Borski did not open his eyes. "Miss Deno, you are not as clever as you think. I suggest you save your college psychology for cocktail party chatter. That is all it is good for. The fire on the Shelf Five had nothing to do with this."

Lottie looked at her watch again.

# # #

The submarine did not look like anything Daily had ever seen before. In truth, he had never seen a submarine in real life, but this did not look like any pictures either. He hadn't realized they were that big and most of this was still under water.

He ran up to the edge of the polyna. Although he could see a flat deck, the sides of the sub were smoothly curved and he could see no way to get onto it. A streamlined metal sail housed the conning tower, and two men were standing on top of it, looking down at the other side of the sub. More men were coming out of a hatch on the deck, hastily donning jackets of blue melton cloth. Except for a few glances in the direction of the ekranoplane, they ignored Daily, concentrating on the other side of the sub. Inspecting the damage, he supposed.

He cupped his hands around his mouth. "Hey! Are all you guys okay?"

One of the men on top of the conning tower turned to him, and now Daily could see the insignia on his cap. "We have suffered a rather serious bit of damage, I'm afraid. I rather do hope your airplane is insured. Flying a bit low, weren't you?" The other man, a young Japanese, looked grim.

"I mean, are all your crew okay? Can they walk? You're going to have to abandon ship."

The Captain looked at his companion, and to his officers on the deck. "I think not. The damage is repairable."

"No, there's going to be a big explosion. Some terrorists

have planted a bomb. You won't have time to get away. We have helicopters coming to fly you out."

"This is a fully loaded oil tanker," said the Captain. "We do not simply abandon it, particularly if there are terrorists about."

"Oh, for Christ's sake," muttered Daily. Small knots of engineers and officers were gathered on the deck now, and the captain was climbing down from the sail. They were all very much interested in the other side of the ship.

Daily looked at his watch, then looked impatiently around for the helicopters. He had already decided that if these turkeys didn't want to move, he wasn't going to hang around trying to persuade them. Before he could leave, however, two Goanese sailors extracted a metal ladder from another hatch on the submarine's deck and extended it to the edge of the polyna. Daily immediately used it to jump across to the sub. They looked surprised and he pushed past them, coming up behind the Captain.

They were looking down at the water. Daily was about to speak, but couldn't resist looking down to see what they were so interested in. He was surprised to see that a skin of ice had not yet formed on this side of the polyna. In fact, the water was foaming slightly, as though it was starting to boil.

He said, "Are you losing air?"

Everyone looked at him. "No," said the Japanese man, in unaccented english. "The long chain organic compounds in the water are being degraded to small, light, gaseous molecules by molecular machinery. The light gases are bubbling off."

"Uh huh," said Daily. "Listen, there's a nuclear warhead that may or may not blow your submarine right out of the water. You guys are going to have to bail out." Then the realization hit him and he nearly screamed. "Molecular machinery! You mean *nanites!*"

"Well, you don't have to go on about it," said Basil Thompsen.

# # #

Simon Weissbaum was from Arizona and like dry air. In his NSA sublevel, he kept the air conditioning on full blast. It made the room cold but kept the humidity down. He was wearing a wool jacket and sitting at his terminal, eating a pastrami sandwich while leafing through this month's Computer Shopper. Mustard dripped on his fingers, he had to wipe them off before answering his phone. "Weissbaum."

"Simon! Dude!"

"Lottie! Babe! Long time no see!"

"Yeah, but I can't talk, Simon. I'm squirting you a program. Gotta' have a Tornado Watch *right now*."

Simon looked around. Surrounding him were flat black cubes, seven and a half tons each, outlined in blinking red LEDs. The red lights served no purpose, they were there for style. The cubes were Connection Machines, ultra fast computers, and they ran TORNADO, the NSA's high priority decryption sytem.

"You got it, Lottie, but I need authoriza . . ."

"Andy Carlyle."

"Coming through now." His terminal indicated that the sequencing program was already downloading, and the keyboard clicked rapidly as Weissbaum's fingers drummed on it, killing the other programs in mid-run. "Crash priority?"

"Crash and burn, dude. Give it everything you've got, and keep this link open."

The last of the cyrillic characters disappeared from Weissbaum's screen, and he knew the program was already being broken down and analyzed by his own computers. "It's all yours, Lottie."

# # #

Lottie set up the sequencing program, so it would be ready to go when she had the key. There were other programs on the drive, but she resisted the urge to examine them. The old CM was not a virtual machine and the input/output would bog down if too many programs were running. She set up a test program and went back to the cabin.

The first of the Redhawks was already taking off, kicking white clouds of snow over the men remaining on the ground, and a second one was coming in to land. Half a dozen Eskimo Scouts were shepherding the men on the ice. She had asked Hasbrook to send some armed men back with the Redhawks, in case the crew from the Aldershot proved recalcitrant.

Thompsen had been brought aboard the ekranoplane, demanding to speak to its pilot. He was giving her no problems now; perhaps deciding it was not worthwhile to argue with soldiers carrying M16s. "I want all your people on the helicopter," Lottie told him. "Is everybody off the sub?"

He said, "We are putting the boilers on hot steam standby and slow rolling the turbines, then the engineering officers will be off."

"If the explosions don't happen, we'll return you to your sub."

"It is not a trivial thing to restart a boiler that has been through an emergency shutdown. If the polyna closes up before we can do so, the tanker may be damaged, and thirty thousand tons of crude oil released. I hope you are prepared to take responsibility for that, Miss."

"Yeah, right," said Daily. "You guys just dumped nanites into the ocean and now you're talking about our responsibility?"

"What are nanites?" said Lottie.

"We did not 'dump' the nanites," said Thompsen stiffly. "The hull and tank were penetrated by a blade spun off one of *your* turbines here, when you hit us with — whatever the hell this damn thing is."

Borski had climbed up off the floor and was now sitting in the pilot's chair. He seemed very short of breath, but he spoke up anyway. "Nanites. Now, you see. There is no reason to wait for the code. You will have to let the bombs explode anyway."

"Just shut up," said Daily. "How long do we have, about?"

"Nine minutes," said Lottie. "What are nanites?"

"Nanites are ecological disaster!" said Takanasha. He was in

the cockpit also, and had been pacing nervously back and forth. "Microscopic metal insects that reproduce themselves and destroy anything they touch! This man is right. We must destroy them now, before they spread. Once the currents carry them away, there will be no stopping them."

Lottie looked at the circle of men. "Is this for real?"

"I think so," said Daily. "That's what they say on television shows."

"It is true," said Borski. "You have no choice. If a single one escapes it will reproduce itself until the Earth is covered with them. You must let the bombs go off. It is the only way to be sure of getting them all."

"Nuke them!" said Takanasha.

Thompsen clenched his teeth and said nothing.

Daily said to Lottie, "The more I think about this, the more it sounds like bullshit. Are the other bombs really enough to melt the Arctic?"

"Other bombs?" said Takanasha.

She shook her head at Daily. "I don't know. We're talking about climactic change and weather has always been a non-linear phenomenon. The butterfly effect, sort of. Small changes that produce big results in the end. The Canadian climate model showed that."

Daily looked from Thompsen to Borski and back again. "Hydrogen bombs and nanites. I never cared much about environmental stuff but compared to these guys I'm a fucking tree-hugger."

# # #

Rais topped a pressure ridge and saw the submarine first. The Yanks spared no expense for this raid, he thought. He saw the wrecked ekranoplane and assumed the Americans had shot it down. Back behind it, the drilling platform looked deserted. Only a few soldiers remained around the plane, and a single helicopter remained on the ice. He had expected a lot more. Apparently it was all over.

He slumped down behind the pressure ridge and unbuckled

his skis, setting the Mossberg on the ice beside him. He put his face in his gloved hands, but the icy cold did not provide the right conditions for sitting around in despair. After a few minutes he dug out his mobile phone and looked at it blackly.

I should have called right from Painchaud's cabin, he thought. I worried too much about security. They already knew about us. What was I waiting for?

He started to hurl the mobile phone across the ice, but common sense took hold of him, and he stopped his throw and punched St. Vincent's private number into the keypad.

To his surprise St. Vincent answered.

"Jean?" The voice was low and controlled. St. Vincent was thankful he had set his phone to vibrate instead of ringing, and thankful that the Americans had not taken it from him. He had his face turned to a bulkhead and was hunched down into his parka with the hood pulled up to conceal the phone. The Redhawk's cabin was insulated, but still noisy enough to cover his voice. "Where are you?"

"I'm on the ice, next to a submarine. Where are you?"

"I'm in my DeHavilland," St. Vincent lied. "I managed to get away. Can you see the ekranoplane?"

"I see a plane. The wings have been shot off."

"That's it. Now listen, Jean." St. Vincent let the mobile phone slip inside his parka and looked around the Redhawk. The American soldiers were alert but not watching him with any particular interest. He turned away from them. "The bombs are armed, but the Americans are trying to disarm them from inside the plane. Can you destroy the plane?"

"I can, Michael." Rais spoke with assurance.

"Do it, Jean. I'm coming to pick you up. Don't worry, we'll have enough time to get away."

"Consider it done, Michael."

St. Vincent folded up his mobile phone and let it drop into an inside pocket. He turned around and sat down on canvas bench, resting his head against the webbing that lined the cabin. He saw the American soldiers looking at him. He closed

his eyes and frowned.

It was a pity about Jean. He was a good man. St. Vincent would, of course, make sure that his family was taken care of. And at least Jean would die for a good cause.

St Vincent nodded, and opened his eyes again. He would name something after Rais. A platform, or a tanker, perhaps. He wondered if the blast would be visible from from the helicopter.

# # #

Lottie's palmtop computer beeped. She looked at it. "That's it."

Borski and Takanasha moved at the same time, both instantly making a grab for the Gateway palmtop. Borski leaped from his seat on the pilot's chair. Takanasha, younger, slimmer, and faster, drove into Lottie from behind and tried to reach around her. Lottie went down on her side, Borski and Takanasha on top of her. The palmtop sprang from her grasp and skittered across the floor.

Takanasha dove after it, but was stopped by Daily's snow boot kicking him in the side. He doubled up in pain, but still grabbed Mike's leg. Borski edged around them both, grabbed the computer, and smashed it down on the steel deck with a sharp crack. He was about to raise it up and hammer it again when Thompsen's shoe pinned his arm to the floor.

Thompsen hadn't quite been able to follow along with the conversation. "What's all this about?"

"Nothing!" snapped Lottie. "I'm not decoding with my palmtop, that's just a stopwatch program beeping. I already sent the program to Fort Meade. The bomb computer is in the back."

Borski and Takanasha said nothing. Lottie got up and took the palmtop from Borski's hand. Takanasha let go of Daily's foot. They all watched silently while Lottie went to the radio. "Still there, Simon?"

"Still here, Lottie. Good news."

"You got it?"

"No, but TORNADO has a preliminary analysis. It's an old trapdoor-knapsack algorithm. We can solve it quickly using probalistic methods."

"How long?"

"Seven more minutes, plus or minus three minutes."

"Send me the key as soon as it comes off."

"You want that encrypted?"

"No. Send in clear."

"You got it, babe."

"Okay, dude."

# # #

The other side of the pressure ridge slanted sharply down toward the open polyna, so Rais had to move carefully along its peak, shifting his position to get the sub's sail out of his line of fire. He did notice that, oddly enough, the water near the sub was bubbling slightly, and surmised that it was releasing steam from some underwater vent.

Flattening himself to the ice, he surveyed the downed plane. It would have self-sealing fuel tanks, he was sure. It would be useless merely to shoot a hole it. A rubbery foam would flow from a sandwich layer in the tank walls and harden over the hole. But Rais was prepared for that.

He emptied his pockets onto the ice, then selected the three the RDX shells. Each contained a small charge of granular explosive, enough to blow the lock out of a heavy door, or knock a hole through a brick wall. Rais was certain that just one would ignite the plane's fuel tanks in a rather spectacular fashion. He slipped them into the magazine beneath the barrel, then racked the first shell into the chamber.

He propped himself up on his elbows. God, it was cold. His eyes found the fuel tanks, at the base of the stubby wings. Pulling off one glove with his teeth, he wrapped a finger around the trigger of the shotgun and sighted down the barrel. The BAM of the shotgun was lost in the gusting wind and cracking of the frozen sea.

# # #

Borski was back in the co-pilot's chair, slumped over. He looked very tired. "Nanites," he murmured, as if to himself. *"He pried from the insect jaws the bright crumb of steel."*

Lottie gave him a sharp look. The line was from the same poem she had read to Danello. "Mike, come here."

Daily followed her back and watched her at the keyboard of the CM. "Will we have time?"

Lottie ran the present sequence up on the CRT. She typed and talked at the same time. "Yeah, I think so. You know, for a pacifist, you're pretty aggressive."

"I wasn't a pacifist, I was a draft dodger. It's not the same thing. Anyway, I was older then, I'm younger than that now."

"Uh huh. Mike, when the keyword comes in, I'm going to shut down the arming program. I don't know anything about these nanite thingies. Someone else will have to worry about them. Hydrogen bombs, I know I don't like. Get these people into the Redhawk. Tell Hasbrook to take off in six minutes if I haven't given him the all clear. Even if it means leaving without me."

"Right," said Daily.

"You didn't have to agree quite that fast."

"Sorry."

"And Mike? If one of those three assholes tries something, shoot him."

"Right," said Daily.

# # #

Kyle Wegmer rounded the ekranoplane and allowed himself a moment to admire it. It was one hell of a beast and perfect for crossing tundra. The Air Force had nothing like it, at least as far as he knew. He skied to the Redhawk and leaned in the door. The Colonel was talking with the other helicopters, verifying their progress away from the battle site.

The RIO said, "Sir, our listening posts at Alert and Inuvik picked up a large explosion on the eighty-fifth parallel, almost directly north of us."

"That's it, then," said Hasbrook. "We're clearing out." He

pointed to two of the infantry, "Get those people off the plane," and then to Wegmer. "Check that everyone is off the sub and then get back here right away."

The RIO said, "Sir, an ALEXIS satellite has verified that the explosion was thermonuclear." Wegmer left at top speed.

Civilians. There was always one who didn't get the word. Wegmer had checked the sub only a few minutes ago and it had seemed deserted. Tough luck for the tanker to surface right in the middle of a battle zone. But it was a good thing he checked again because now there was a crewman left, on the ridge behind the sub. Wegmer skied to the edge of the polyna and came to a stop in a spray of ice crystals. "Hey buddy! Yo! We're moving out! Leave your stuff and come with me *right now*!"

Rais shot him in the chest.

At the sound of Wegmer's voice, he dropped the shotgun and rolled over instantly and rapidly, bringing the Webley out from under his parka in one quick, smooth motion, snapping off two shots, not waiting to see the soldier fall backwards before he scooped up the shotgun again and scuttled for cover behind the submarine's sail. Furiously he tried to work the action of the shotgun. It had jammed with the first round, the metal parts contracted beyond tolerances with the intense cold, and Rais had stared in disbelief when his shot at the plane seemed to have no effect. Now he swore continuously as he gripped the slide with both hands and pounded the stock on the ice. Finally the action broke free and ejected the spent casing. Rais grabbed it and looked at it. It was tear gas shell. In his haste he had picked a wrong cartridge.

He tossed it away in disgust and chambered the next round, this time checking it to make sure it was an RDX shell. Abandoning concealment, he stood up on the pressure ridge and sighted over the top of the sail, drawing a bead once again on the plane's fuel tank.

# # #

Daily stuck his head in the hatch of the ekranoplane. "The

bombs are going off. Come on, we've got to get out of here!"

"We have time," said Lottie calmly. "This will be the last one to go off."

"Are you sure? How can you be sure? I don't think . . ." He broke off, listening. "What was that?"

"I didn't hear anything," said Lottie, but Daily had already pulled the little H&K from his parka and was running across the ice.

Lottie considered dropping out of the hatch to see where he was going, but the radio signaled her. She went over to it. "Simon?"

"Sasha, Lottie. S A S H A."

"Thanks, Simon." She broke the connection and raced back to the CM.

# # #

Wegmer kicked off his skis and lay on the ice, writhing in pain, cursing furiously under his breath. That bastard on the ridge was one hell of a shot. The first bullet had torn into Wegmer's right shoulder, ripping through tendons and muscle, and shattering the bone. The second had punched jagged hole in his right lung, then bounced around inside the ribcage, tearing more flesh before coming to a stop.

Wegmer tried to call to his buddies. Instead, the wound in his chest sucked air and his throat choked up with blood. His right arm was completely useless. White hot pain lanced through his head. Kyle Wegmer was in bad shape.

But you don't become an Eskimo Scout by being a wimp. Wegmer stuck his left fingers in the holes in his parka and tore the fabric away, knowing that the subzero air would freeze the wounds shut in less than a minute. The cold, and shock also, numbed the pain. He rolled over on his left side and pushed himself to his knees, spitting the blood out of his mouth and letting in drain from his throat. Breathing become a little easier, and he picked up his M16 and rose to his feet.

The sniper was nowhere to be seen. Obviously he was behind the submarine. Wegmer's eyes found the metal ladder

and he crossed it in a staggering run, the rifle in his left hand, his right arm dangling at his side. He picked up speed crossing the metal deck, and he dove around the edge of the sail, sliding across the deck, raising the barrel of the M16. He saw the sniper crouched on the pressure ridge and he pointed the rifle and squeezed down on the trigger, firing off the full clip. Spent casings clattered on the steel deck. The sniper swung his gun around and looked at him.

# # #

In the ekranoplane Lottie was watching the program run through its paces, drumming her fingers on the console. "Come on, come on, come on," she muttered. The radio signaled her and she dashed forward to the cockpit. "Yeah, what?"

"Lottie, this is Murli. I'm at the Pentagon. We have the solution to the nanite problem. Let the bombs explode."

"What!"

"I've been running the model. We can stop the global warming. We can bomb the Greenland ice cap along the Davis Strait, between Nuuk and Asiaat. If we do it right, the shelf will calve off icebergs into the Davis Strait. The melting ice will densify the Labrador current enough to keep it from shifting."

"Murli, I don't think . . ."

"It will work, Lottie. The Canadian model confirms it. The Pentagon is going operational right now."

"Murli, if you calve off that much ice, the sea level will rise."

"Yes. Some."

"How much?"

"Ah . . ."

"*How much, Murli!*"

"Eighteen feet."

"Fuck you, Murli!" Lottie slammed down the microphone, breaking the connection. She realized her error immediately and called the RIO. "Patch me through to Manyard at the Pentagon. Now! Right now!"

# # #

The burst from the M16 tore up the ice about two yards in

front of Rais, sending splinters of ice flying everywhere and Rais moved on reflex alone, swinging the shotgun around and firing. No answering fire came from the soldier — the RDX shell demolished his chest — but Rais took no satisfaction from his accurate shot. The shotgun had jammed again, the hot barrel and ice-cold receiver no longer functioning together. Again he pounded the buttstock on the ice to break it loose.

He heard shouting and looked up to see snowsuited soldiers pouring out of the helicopter. Ahead of them was a man in a dark blue parka, shouting and waving. His hood and boots told Rais the man was an oilfield worker. Damn it, didn't he know that Rais was on their side?

The shotgun broke free and Rais racked the third and last shell. This time he stood full upright, bring the shotgun to his shoulder and aiming over the rig worker's head. The rig worker had stopped and was in a combat crouch, both hands straight in front of him. To Rais's surprise he held a pistol.

The pistol went POP-POP-POP-POP and Rais flinched. He couldn't help himself, the shots spattered right around his feet and he took a step backward, lost his footing, and in a moment was sliding sideways, down the ridge and toward the open polyna. There was no way to stop his downward rush, no way to get a purchase on the smooth slick slope, so he concentrated on gripping the still loaded shotgun, until he crashed through the thin skin of sea ice and into the chill ocean.

The ice-cold water sucked away his breath but he held onto the shotgun and sputtered to the surface, flailing his arms at the surrounding ice. He laid the shotgun on top of a floe and tried to pull himself out of the water, still certain he could get off a shot before he froze. But the mushy sea ice broke beneath his weight, and his water-soaked parka and boots dragged him down. He tried to pull off the parka and, to his surprise, it came away in his hands. In large, disintegrating wads.

The water around him was bubbling now and felt scalding hot. Rais stared in bafflement at the blisters forming on the backs of his hands. Moments later, the full impact of the pain

hit him. He had time for several long, drawn out screams, before he disappeared beneath the ice in a pale, pink, foam.

# # #

Hasbrook was waiting for Daily and pulled him into the Redhawk. He put Takanasha, Thompsen, and Borski in the back of the Redhawk, where snow-suited infantry watched them suspiciously. "Where's our lady friend?"

"Disarming the bombs," said Daily. He looked at his watch. "We take off in two more minutes, she said."

"Fine," said Hasbrook. "Radio says the damn things are going off all over the place. Pentagon's going apeshit. So is Minsk. So is everyone else in the world. We'd have global nuclear war right now except nothing's getting blown up except ice. If anyone even thinks they see a missile, it will all be over."

Daily was looking out at the shattered ekranoplane. There was no sign of Lottie. He looked at his watch again. The second hand was crawling by. "If this goes off, how far away do we have to be?"

"A minimum of six miles, they tell me. I don't know where they got that number from. They're big bombs, but they're under water. I'd like to have some safety margin, though."

"I'm with you." Daily looked at his watch again. "Lots of safety margin. What does your watch say?"

"Same as yours. Relax. We have time."

"Relax! Jesus, it's a hydrogen bomb."

"Well, at this distance, it would kill you just as dead if it was only an A-bomb."

"That's very reassuring. What's taking her so long?"

"You're asking me? I don't even know what you two are doing here. And I'm not supposed to ask questions of spooks."

"Reconnaissance," said Daily.

"Yeah, right." They waited in silence, Hasbrook looking the whole time at *his* watch. "Okay, time to go." He made a motion to the pilot, moving his palm upward in a short, sharp jerk.

"No, wait!" said Daily. "We can't leave without her!"

"Hell we can't," said Hasbrook. The Redhawk's engines increased their noise and the skids lifted off the ice.

"No wait, here she comes!"

Lottie appeared in the hatch of the ekranoplane, looking very small against the backdrop of the disabled structure. She had left her huge purse behind and held only a stuffed Garfield doll in her left hand. She dropped to the ground and began running to the Redhawk.

"Come on," said Daily under his breath. "Move, move."

The Redhawk's blades were kicking up ice and snow and Lottie stopped momentarily to wipe her eyes with the furry toy. Daily slammed a palm against the window in frustration. When she got to the door he slid it open, grabbed her arm, and lifted her inside.

"Up!" said Hasbrook. The Redhawk took off so fast that Daily and Lottie both lost their balance and sat down suddenly on the floor. Hasbrook watched them and grinned.

"Is it going off?"

"Yes!" Lottie yelled back over the roar of the engines. "It's all going to blow sky-high. So let's get out of here."

In the back Borski was sitting on a metal rack, leaning back with his eyes closed. Now he opened them.

"What!" said Daily.

The helicopter rocked as it gained altitude. Lottie looked for a place to sit down. "You know how it is with bombs. Cut the red wire, cut the green wire, who knows?"

"What! What wires? I thought you had the code?"

"I did. It's going to blow anyway." She leaned against a bulkhead and looked pointedly at Borski. "Sasha. The damn password was Sasha."

The Russian nodded. "Batistein's wife."

The Redhawk was approaching its top speed of 150 knots. Borski, watched carefully by the soldiers, made his way to the front of the helicopter. "We should circle and climb," he told them. "We will want to see this. This is history in the making. It will be very great." His voice was very quiet.

"Don't look at the flash," said Hasbrook.

"There won't be a flash. This is an underwater explosion."

"There it goes."

For a brief instant the pack turned light green. The drill rig leaped up momentarily, then disappeared inside a white plume of fractured ice and salt spray that climbed in seconds to two thousand feet. As the spray dome collapsed the base spread outward, tossing great slabs of ice, and the ekranoplane, a hundred of feet in the air. They tumbled back into foaming white water, and clouds of condensation fog billowed outward as the ocean spray met the chill arctic wind. The shock wave hit them and the Redhawk shuddered and dropped a hundred feet, then smoothed itself. Down below the circle of destruction spread outward at seventy miles per hour, until all they could see was a smooth white cloud.

"There!" said Takanasha, pointing.

They were rapidly leaving it behind, but in the distance they could see a mass of orange flame and dirty brown smoke.

"I thought you said there wouldn't be a fireball."

"There isn't," said Thompsen. "That's the oil from my submarine burning." He looked grim and unhappy.

Hasbrook was staring in disbelief. "What the hell?" he muttered.

"Russian technology triumphs," said Borski. "I knew Pavel would not let those devices be disarmed so easily." Then he carefully lowered himself to his knees, and leaned forward till his head was cradled in his arms. It was the position of a small child about to say his bedtime prayers. Lottie looked at him with concern.

"Are you all right?"

Daily was still looking at the ice pack. He scowled at the roiling white clouds. "Looks like Los Angeles down there."

"It looks beautiful," said Borski, and then he slipped over on his side and died.

Lottie was the first to react. "We need a doctor!"

"In the other chopper," said Hasbrook.

Daily had dropped to his knees and was unzipping Borski's parka. A soldier with EMT training came forward and took over. Borski chest was awash with blood. It had been soaked up by his parka, the insulation was saturated with it. Daily looked stricken. He pulled up the zipper and looked at the outside of the parka. No blood showed, but low in the stomach he found a small hole.

"Damn it," he said. "I did shoot him after all. Why the hell didn't he say something?"

"That wasn't a hydrogen bomb," said Hasbrook. He looked at Lottie. "I don't care what this guy said, or how damn deep it was, that was not big enough to be a hydrogen bomb."

Lottie touched Borski's hand. The skin was already turning gray. "No," she said. "I disarmed the hydrogen bombs. That was a nuclear-tipped torpedo from one of our Los Angeles class submarines. I called the Pentagon and they authorized it."

"To take out the nanites?"

She nodded, still looking at Borski. "To take out the nanites." Then she zipped his parka back up and put the Garfield doll in the crook of his arm. She stood up and looked out at the ice pack, seeing only smooth white stretching to the horizon. The Redhawk flew steadily on.

# # #

Manyard was not happy. The raid had gone exactly as planned, but they had stopped only a few of the explosions. Operation successful, he thought. Patient dead. They had captured the Canadians without taking or inflicting any casualties. Good. But the Russian was dead and couldn't answer any questions. Not good.

At least the Intelligence people would take the blame for that. It wasn't the military that shot the Russian. Small favors.

He glanced at the folders in front of him, and put them under his chair. He was waiting for Ventner at the Sans Souci. The Secretary of State was a little late, but that was understandable with Washington traffic and Washington schedules. And the waiters here knew that. They didn't hover.

Manyard did not feel like he was being snubbed, yet.

Borski had covered his tracks well. The Russians were denying any involvement whatsoever, and had produced documentation to show that the weapons had not come from their plants. Not that Manyard believed them. It was the same sort of denial he would have made and, God damn it, the bombs had to come from somewhere! His fist tightened around his glass as he picked it up. Then he saw Ventner being shown to the table and the general quickly finished his drink so he could motion to the waiter to bring him another.

Ventner sat down, unfolded his napkin, and said without preamble, "The water temperature in the Arctic has increased by four degrees over the average normal temperature for this time of year."

"That," said Manyard, "is a lot." He had studied the AIDJEX files. A four degree rise spread over that much ocean represented a lot of energy. Far more than was contained in twenty hydrogen bombs.

"Maybe not enough, Rick. Barnett at the Scripps Institute thinks a rise of eleven degrees would be needed to trigger global climate changes."

"Good."

"But the simulation we stole from the Canadians says that only four degrees are needed. We're right on the borderline."

"It's crap."

"Leetmaa at the Climate Analysis Center thinks it could happen with a seven degree rise. Naramanchi agrees with the Canadian model. Kousky thinks . . ."

"Okay, okay." Manyard held up his hand. "So we still don't know if the place is going to melt or not until we study the thermohaline circulation."

"I'm afraid so. Wood's Hole Oceanograhic is working on it right now. I don't know if anyone can give us an answer we can count on. Meanwhile, Indonesia, and Holland, and all the other low elevation countries are screaming in my ear every day." He looked at the menu. "What's good here?"

"Everything. Steak."

"My wife doesn't let me — oh never mind. Incidentally, that weather program has been classified. Ottawa doesn't know we have a copy yet. I don't know if it makes any difference but . . ."

"When in doubt, classify."

"Right. Ottawa is denying any involvement. Says it was all done by Quebecois separatists acting on their own. The Quebecois MPs are saying it was a government conspiracy and are demanding that the CORE platform workers be freed."

"Fat chance."

"I don't know. They made a lot of noise and they killed a lot of fish, and so far that's it. As far as anyone who isn't a scientist can tell, nothing is happening. And if our climate models are right, nothing will continue to happen. If we're wrong, ten years, or a hundred years down the road, maybe they'll be some flooding. Are people going to start World War Three over that? Maybe each year the summer will get a little hotter, and the winters a little dryer, and so what? Are we going to invade Canada for something that happened twenty years in the past?"

"Hell, yes!" said Manyard. "That's exactly what we should do. The American farmer isn't going to just take it when the Midwest turns into desert." He took the folders out from under his chair and put them back on the table. "Now look, Ron, this is a very preliminary study, so don't hold me to any of the numbers, except within an order of magnitude. It does show that an invasion of Canada is practical. Remember, most of the major population centers are very close to the border. We damn near control the mass media already. We'll totally dominate the air and our supply lines will be very short."

"You're really proposing to invade Canada? Come on, Rick."

"I'm just asking you to keep an open mind."

"The Midwest wasn't going to turn into a desert," said Ventner. "I've sat in on some of the interrogation sessions with this guy St. Vincent. He's perfectly willing to talk to us. Hell, we

can hardly shut him up. He's had all sorts of studies done on the area. There will have to be radical changes in crop choice and farming methods, but potentially the area could maintain ninety percent of its productive capacity, even in the event of global warming. Which might very well happen anyway. It sounds wild, but he's got the facts and figures to make it believable."

"Impractical," said Manyard. "He expected us to build a massive reservoir and irrigation system to bring Great Lakes water to West. He proposed building a dike across the mouth of the Hudson Bay to keep the fresh water in and supply it to the rest of the continent. Ridiculous."

"If he told you he was going to melt down the North Pole, would you have said *that* was ridiculous?" His mobile phone trilled and he gave a brief look of apology to Manyard before taking the call. In a moment he put the phone against his chest. "That was Wood's Hole. They say the Gulf Stream is right on its usual course. So far."

Manyard frowned and set his drink down on the folders.

# # #

Macpherson was back from vacation and Lottie sat in front of his desk, shuffling through snapshots of rain-speckled Arkansas lakes. Half of the photos showed a water-logged Macpherson holding up a graphite spinning rod, accompanied by black bass of various sizes. Outside the window the Washington sky was light blue and cold. Mac was looking a lot less tired than when he had left.

She talked while she looked at his photos. "Making the bombs was the key to the whole thing. St. Vincent had uranium. He could have gotten plutonium. I'm sure he had the money and resources to build fission bombs. But a fusion bomb is a whole different kind of animal. There was simply no way he could have built them. It requires a small industrial city. Even with government backing, it takes a minimum of two years to start a hydrogen bomb project from scratch."

"Why didn't he just buy them? If a West German drug

dealer can buy plutonium, a Canadian industrialist would have good chance to buy a warhead."

"Nothing big enough. The Russians may have a few as big as twenty megs, for bombing NORAD and things like that. But anything bigger is custom made."

Macpherson was using a brass nail to stuff his pipe. He nodded. "So St. Vincent subcontracted the job to this man Borski, who'd he'd met during the AIDJEX study. Somehow Borski had his own — I guess we have to call it a terrorist group — that could use Soviet equipment to build the hydrogen bombs. All the inspectors were keeping tabs on the supply of Soviet uranium. They never figured someone would bring in their own uranium from outside."

Macpherson was pleased and made no effort to hide his feelings. His department had finished quite well out of this. He'd told Lottie that the Office of Economic Intelligence would get an expanded budget to investigate the effects of the explosions on the world economy. Also that she was being commended for her intelligence coup, and that there would be promotions all around.

"St. Vincent hasn't admitted supplying the SNM yet, but that's the way we figure it. Just how Borski did it we don't know yet. Carlyle says the MVD has made some arrests, but there's a lot of confusion. God, that's one muddled up country. And so much of their economy was underground to start with." She held up a photo. "What this?"

"Catfish. Nice size, but they don't put up much fight. Actually, Lottie, I'm inclined to think that we should have let them do it."

"Come on."

"No, think about it. If the North Pole really melts, their economy will get a boost. There's a lot of untapped oil resources in the north. And our economy will get a boost because we manufacture the farm machinery and drilling equipment for the rest of the world. We could do very well from this."

"As long as we invest the profits in building irrigation systems."

"Not so much. A lot of the marginal farmland deserves to be taken out of production anyway." This was a subject for hot debate. Mac was already looking forward to the vast reports his department would be generating for years to come.

Lottie finished looking at the vacation photos and handed them back across the desk. "Nice catch. Too bad it rained all the time, though."

Macpherson took his pipe from between his teeth. The corners of his mouth quirked upward.

"What's this?" said Lottie. "You're going to make a joke. Mac's actually going to make a joke." She leaned forward.

Macpherson leaned back. "Well, you know what they say. Everyone complains about the weather, but no one does anything about it."

"Oh, shush," Lottie said.

———————————