

# ZONA

by

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## Zona

I open my notebooks and, in memory, I am back in the days of the Zona. I become like a wandering archaeologist digging through the dusty relics of time and times so far separated from my fresh todays and unknown tomorrows that I feel no immediate emotion. But then, like shards of ancient pottery kicked up out of the dry sand, I begin to discover images and feelings returning to life—hodgepodge, a jumbled welter of faces and voices and places. Truly they are like broken shards in the sand, separated from each other, belonging but no longer connected by the seamless continuity of the original experience. Some are sharp-edged and troubling like freshly broken pieces of glass; some are warm and comforting—smooth pebbles rounded by the unrelenting rub of the river of time:

It is November 1990 and it is three o'clock in the morning. I lie awake and fully clothed unable to sleep. It has been three days since we arrived and the circadian shock of moving across nine time zones has subsided. My restlessness is not the evidence of a biological clock out of kilter. Rather, it is because an apprehension is growing in me which is almost certainly irrational but, nevertheless, impossible to ignore. Across the short compartment space of the creaking, rattling, lurching train, I can make out the outstretched shadow of my wife, Nancy, also fully clothed and apparently asleep on the scruffy well-used mats we were given to soften the shelflike benches which serve as passenger seats during the day and makeshift cots by night. Above me on an upper cot, I hear

## *Zona*

a gentle snoring. Our friend, Vladimir, is obviously having no trouble sleeping. He trusts my professional judgment and assumes there is nothing to be concerned about. I hope he is right. Above my wife's cot there lies a stranger, a woman, also asleep in what to her must be familiar and seemingly unthreatening surroundings.

Hours earlier, we had all been peering out through the grimy brown-streaked windows of the sorry and neglected train watching the dull, flat winter-barren landscape moving by. We had eaten our sandwiches and candy bars and some of the fruit brought from the sumptuous markets of Belgium. We had walked often through the filthy, narrow corridor that ran lengthwise along the railroad car. The trip was already absurdly long and, more than once, we had all reluctantly used the unspeakably ugly—worse even than India—toilet at the end of the car, each one of us, I am sure, barely able to keep from retching before the onslaught of odors and filth. Outside the toilet, an old snaggle-toothed crone of a woman with an officious air about her sat during the day, guarding a sad little coal-fired samovar. Tea was available if you dared to ask.

Vladimir was our real window into this world. He was perfectly at home in English, Russian, Ukrainian, and perhaps half a dozen other languages. He was both our personal unofficial interpreter and he was also our friend, despite the fact that we had spent only brief times with him in the United States and had now been with him in his native land for just a matter of days. A barrel-chested, white-haired man of 70 or so, Vladimir Hizhniak is a survivor. He is a writer who has translated works by John Le Carre and Len Deighton and others into Ukrainian. He is the frequent author of insightful magazine articles and a former Soviet paratrooper with nearly 100 jumps during World War II. As a war veteran, he gets a pension and he has a small apartment in his home town of Kiev. The apartment is filled with little mementoes of his life and he retells us more than once the story of his state-murdered father and his elegant, aristocratic mother whose world was destroyed by the communists. He clings both literally and in spirit to a few remnants of his mother's once-high

station: some jewelry, some photographs, and, above all, the memories. Yes, Vladimir is, indeed, a survivor. Somehow he became an official translator for a high-ranking Soviet general officer and attended critical international conferences. After the war, he established himself as a teacher of Soviet citizens wishing to learn English. Over the years, he has taught English to hundreds, if not thousands, of party functionaries, industrialists, and others. Thus, he became, in his own words, one of the best-known persons in all of Kiev. Though currently he has only a couple of students under his wing, it is impossible to walk around Kiev or go into a government building without encountering Hizhniak's former students. And while a couple of students does not sound like very many, the dollar income (and he does get paid in dollars) that Vladimir gets from his language instruction allow this remarkable man—who, by the way, carefully guards his *British* English against too much contamination by *American* English—to live in comparative comfort even in the inflation-shredded economy of today's independent Ukraine.

But the sudden shattering of the Soviet Union which made Ukraine independent still lay beyond our vision as we rattled through the dark countryside that night in November of 1990. We had come to undertake this strange journey through a long chain of circumstances which culminated in official invitations from the Ukrainian and Byelorussian governments proposing that I come to both their countries as an independent observer, all expenses paid, to assess the ongoing impact of the catastrophe called Chernobyl. I would be free to meet with anyone I chose, from deputy prime ministers to the humblest of peasants, from current plant managers to former reactor operators. The intent was to enlist my help in trying to rekindle American interest in that awful festering wound which still remains unhealed amid the farmlands and forests northwest of Kiev. Those behind the invitation knew that I had background in nuclear science and also that, as an avocation, I was experienced in both the print and electronic media of the U.S. as one time CBS Network Science Commentator and former columnist for World Book Science Service and other syndication services.

Despite the dimensions of the Chernobyl disaster, by 1990 the topic was already very old news and mostly forgotten, or at least ignored, in the West. The desperately impoverished so-called republics of Ukraine and Byelorussia, on their own, had neither the technical nor economic means to cope with the aftermath of Chernobyl. And even today they have yet to get any really significant support from Moscow. The possibility of reawakening Western interest in the problem was remote but they had elected to try and so the invitations came.

I sat in my home here in Chicago and re-read the letters several times before I shoved them over to Nancy. It was around dinner-time, as I recall, and she was busy preparing some lovingly dietetic meal for me to complain about. She stopped her work momentarily to scan the letters, then handed them back and returned to the more serious business of dinner. I think she was whipping up a no-fat, no-oil, low-calorie dressing for our salad. "Do you want to go?" I asked, fully expecting what the answer would be.

She didn't miss a beat with her mixing. "Sure," she said, "why not?"

Lying in that dark train on our way to Minsk from Kiev in preparation for penetrating to the core of the area most heavily contaminated by the accident was when I fully confronted the possibility that letting her come with me might be a terrible mistake. Like Vladimir Hizhniak gently snoring away on the cot above me, she had trusted my judgment. I was, after all, supposedly well-qualified in nuclear science. I had spent 15 years of my professional career in and around nuclear reactors and nuclear weapons programs. I had brought with me a small mountain of technical equipment graciously provided by some of the best nuclear instrumentation manufacturers in the U.S. They had all been very happy to support our mission and were standing by to analyze environmental samples and other data sources upon our return home. I had tried to plan as carefully as I could. But then, at three o'clock in the morning in that strange land, the goblins suddenly came dancing out of their secret lairs. My cool professional estimates seemed to dissolve in an acid bath of unwarranted and unjustified assumptions. Despite all the instrumentation and air

## *Zona*

sampling systems and other paraphernalia I had brought, was it possible that I'd have no genuine control over the radiation and contamination levels to which we might be exposed? I had, of course, been checking levels as we moved about, but on this impossibly dirty and disgusting train, how did I know that while we slept we would not be traversing or stalled in some extremely high-level radiation field or in a sudden windstorm carrying severe airborne contamination? Despite all the promises, might we confront bureaucratic barriers that could prevent me from independently determining the hazards? Would the remnants of the old Soviet system clamp us in some kind of procedural vise and conceal the dangers to which we were actually being exposed? In the gloom of that train compartment, sleep was far away indeed.

The train began to slow toward a stop. It was too early to be arriving in Minsk, the capital of Byelorussia. We were not due there for at least another five or six hours. The dark grey gloom of the compartment began to lighten into a garish blue-green glow. I hoisted myself up on one elbow and looked out. The train was sliding into a station illuminated by a single flickering and sputtering mercury vapor lamp. It was a scene from a cheaply made Frankenstein monster movie. In small weather-beaten block letters, a sign announced that we were in a place called **GOMEL**. The mercury light flickered a few times, then came on steadily. Inexplicably, a discomforting thought came to me instantly. A simple transformation of the letters of that name would spell **GOLEM**—a name given by ancient Jews to a supernatural monster capable of destroying anything in its path. That moment at Gomel is with me now in undiminished intensity. It is one of the few times in my adult life when I have felt totally overtaken by a sense of the irrational. I stared across at Nancy, who was lying on her back, her eyes closed, soundly asleep. Bathed in the blue-green light, she was no longer asleep but, instead, had become a ghastly corpse. I shuddered violently and forced myself back toward sanity. I reached across the small space between us to wake her. She turned toward me and smiled. I smiled back. Her eyes closed again in sleep. Finally, after a time, sleep engulfed me too.

Early morning. Still dark. It is raining. We are approaching

## Zona

Minsk. I turned my thoughts toward handling the luggage. As we wait for the train to sigh to a stop, I flash back to our arrival in Kiev a few days before. We had taken Aeroflot in from Brussels. Our personal luggage contains not only clothes but oranges. The fruit was with us, thanks to wise advice from a *New York Times* reporter who had worked on the Chernobyl story a year or two earlier but had never gotten to the reactors herself. She had told me that oranges would feel like the best luxury on earth after a while and she was right. Most of our luggage was, of course, given over to hundreds of pounds of scientific equipment, video cameras, tape recorders, and still-cameras with rolls of film and videotape crammed into the interstices of every suitcase and box. In my utter naivete, I had not given a moment's thought to getting our massive burden of luggage from Kiev's Borispol Airport to the Octobriskii Hotel where we had been assigned a luxurious suite (by Soviet standards at least) in the prime accommodations of the Ukrainian Communist Party. That we had a luggage problem became immediately apparent when we found there was no such thing as a skycap at the airport. Our mountain of luggage was unceremoniously deposited on the tarmac and it was up to us to get it into the dilapidated and roach-infested terminal where we could join all the obedient Soviet citizens who had raced ahead of us and who were now dutifully awaiting customs inspection. No handcarts. No help. Nothing. It took us about six struggling trips with Nancy trundling more than her share to get into the terminal. As we got into position at the end of the line and while I was still panting I saw, to my dismay, that there were still eight or ten steps up to where grim-faced and impatient customs officers were sullenly going through their procedures. When our turn came, we became human conveyor belts hoisting our cargo up to where the inspections could begin. Needless to say, the volume of material we were bringing raised immediate suspicions. But then suddenly everything changed. The sun came out. Vladimir Hizhniak's smiling face poked out from behind a partition. A large bouquet of flowers was waved at Nancy. Hizhniak and an official interpreter assigned to us from what was, at the time, optimistically termed The Ukrainian Society for International Friendship began earnest conversa-



### *Zona*

tions with the customs officials. As would happen so many times during our stay, one of the officials turned out to be one of Hizhniak's former students. The combination of Vladimir's personal clout with the customs man and the official encouragement of the gentleman from the Friendship organization worked instant magic. There was no customs inspection. All the barriers fell away and we were whisked into official-looking black sedans for our trip into Kiev.

Recognizing that we were lucky in Kiev, we had left some of our cache of blank videotape and film and much of our clothing behind in our rooms at the Octobriskii Hotel when we departed for Minsk. But even though we were traveling relatively lightly, there was still plenty of hardware and luggage to worry about. It was from Minsk rather than from Kiev that we would enter the hottest areas and explore the Zapretnaya Zona—the Forbidden Zone surrounding the wrecked Chernobyl power plant—a circular no-man's land extending some 30 kilometers in radius from the devastated center and officially forbidden to all human presence except for those either operating the remaining reactors or guarding the perimeter. For what was potentially the most dangerous part of our journey, it was not possible to travel too lightly.

Standing in the railcar doorway. As the train gives one last violent shudder, I gaze out at the heavy black mud below. Obviously, we face another luggage problem. But just as I am about to despair, the system again proves it is looking out for us.

Splashing through the rain and mindless of the deep puddles and mud through which he is plowing, a figure comes toward us out of the darkness. The man approaching us quickly came to be called "Igor 1." Our ears were not yet well-tuned to the many polysyllabic names we were encountering east of the old Iron Curtain, and so, when we could, we reduced the strain on our overloaded brains. Igor 1 immediately gives us a demonstration of the resourcefulness with which he and his colleague, "Igor 2," would meet all difficulties in the future: The train had unloaded a long line of people who were slowly progressing toward a muddy stairway that led down under the tracks and thence into the Minsk railroad station. With the rain pouring down, this is not a delay

### *Zona*

that Igor 1 is prepared to tolerate. In excellent English, he tells the three of us to follow him around to the side of the passageway which is defined by walls of glass, perhaps even filthier than the windows of the train we had just left. We wonder what he has in mind. The answer is quick in coming. Some time in the past, a resourceful and impatient soul had broken out one of the panes of glass, thus opening a secret bypass entrance, roughly two feet wide and three feet high, which can get us ahead of the waiting crowd. Instantly, we are all hunkered down in the pelting rain passing our luggage through the opening like a well-trained drill team. We achieve one small and selfish triumph over the inefficiency of Communist railroad station design.

Broken and missing glass, if we can judge by what we know, is a hallmark of the former USSR. Indeed, in the grey stairway of Vladimir Hizhniak's apartment building, the only source of light—a window on the second floor—was partially broken away when we first visited him in 1990. Very recently during a phone call, I asked him about that window. He told me it is still in pieces, ready to slash the unwary. I really look forward someday to hearing that the window is fixed. To me it has become a kind of litmus test. If and when that happy time comes, it will signal that Ukraine and presumably some of the other states of the former Soviet Union will have entered upon a new age and have enough discretionary resources to attend to broken windows.

Back to Minsk. Our quarters are not as grand as they were in Kiev. Incidentally, our Kiev apartment was assigned to us for the entire duration of our stay whether we were in the city or not. The Minsk hotel is a major INTOURIST facility and our room is spare, but adequate. An intriguing feature of the plumbing is that the sink drains are arranged so that they empty into the shower stall. I guess it saves a little piping. Since I am well aware that much of the radioactive cloud from the Chernobyl disaster had drifted into Byelorussia, I decide to play scientist within five minutes of settling into the hotel. I take some filter paper contamination swipes for analysis back in the States and begin sniffing around with my Geiger counter survey meter. In areas under the sink and along the window sills, where the not-too-conscientious cleaning staff

## Zona

generally spared themselves effort, the count rates are four or five times what they were in the center of the bedroom. Despite this, I am relieved to see that the rates are not, in any sense, acutely dangerous. I had heard stories that the residual radioactivity in various *generally accessible* places ranged over several orders of magnitude—a factor of a hundred or even a thousand. I am glad to see for myself that, at least in the middle of this large urban area, I had not brought us into harm's way. On the other hand, I know that back to the southeast where the Zona awaited us, the situation could be quite different.

Throughout our stay in the then Soviet Union, we were caught by surprise by the abundance of food at every meal. In fact, having read the many stories of severe shortages, we had expected that one of the positives of going on this trip was that I would lose a little weight and Nancy would finally escape the blame. I hope I do not sound ungrateful when I say that we probably ate more food, or at least were served more food, than we ever imagined. Both in Minsk and in Kiev, and everywhere else we went, it was very obvious that we were being shielded from the realities of the street. Back in the Kiev Communist Party Hotel, the meals, while huge, were usually made with what might be termed questionable meats. They were also heavily dependent upon root vegetables such as cabbage, potatoes, and beets—oh, the quantities of beets—and oh, how I hate beets! Once after eating, I mentioned we had not yet seen Chicken Kiev on the menu—certainly a dish we should like to try here if anywhere. We had Chicken Kiev four times in succession after I made that remark. I also worked very hard to figure out ways to avoid the jellied carp—a gelatinous mass of transparent glue and distressingly old fish. Contrariwise the breads were wonderful. Nancy has tried often to duplicate them at home without complete success and, of course, without the elevated levels of radioactivity which, I am sure, they often contained.

Our hosts made no effort to conceal the mode of life of the common man from us. It was simply that we were guests of the State and so the relative luxury in which we were living was a matter of routine. While we were stuffing ourselves and feeling guilty about our pampered lifestyle, people on the streets of the cities and in

### *Zona*

the smallest of villages were standing in line—frequently for hours, sometimes for the better part of a day—just to buy whatever they could. Somehow the word would get around that a certain store would have meat, or bread, or clothing or vegetables and, almost instantly, the long lines would form. As we discovered by talking to people in the lines with the help of Vladimir Hizhniak, the hopeful buyers frequently did not even know what they were standing in line to buy. The idea was that money was, or soon might be, worth nothing. Regardless of what was available for sale, if you could convert paper into material things, you were ahead. For that reason, people were eagerly buying two, three, or four briefcases or pairs of trousers, or whatever else might be available, even though they did not need them or even if the items were of the wrong size.

As we wandered through the streets of Byelorussian cities, Igor 2 was our frequent escort. He is a man of great and supple humor who once remarked that the stores in Minsk were very sexy. Why? Because all the shelves were stripped naked. With that slightly bitter sense of humor of his, Igor 2 had a wonderful way of dealing with the glitches which we encountered at various times and places. Paperwork would appear, help would arrive, clearances into areas would be granted. It was magical. We often wondered how and why but, equally often, we just stood back and marveled.

One night in Minsk we went to dinner at our hotel. The dining room was enormous, entirely comparable in size to the grand ballroom of a large American hotel. It was crowded and most of the customers were well-dressed. In contrast to what we had seen in the streets, here there was plenty of food of all sorts and varieties. Tough-looking men were escorting animated young women to and from their tables. A sense of celebration was everywhere. Igor 2 saw the wonderment in our faces and proceeded to explain. First of all, he said the reason that there was so much food in Minsk in comparison to Kiev was because no one wanted to buy Byelorussian food and farm products. While, in the past, Byelorussians had exported food to many other parts of the Soviet Union, now those other regions would have almost nothing to do with

such foods. Produce perceived to be loaded with such spices as cesium-137 and strontium-90 was not to the taste of most Soviet housewives—even the hungriest. So the Byelorussians quickly turned philosophical. They decided to live as well as they could for as long as they could, regardless of the effects of Chernobyl on their food supply. Igor 2 smiled knowingly as he watched us taking in the scene. He let us in on a second secret. It was not *only* because the food being consumed might be heavily laced with radioactivity that made it so plentiful. "This dining room is a popular one with those living the Black Life," said Igor conspiratorially.

"And what is the 'Black Life'?" we asked.

"Simple," he replied. "You deal in the *black* market, you ride in *black* limousines, and you go behind *black* doors to do your business. This is the Russian Mafia. And they know they might die tomorrow."

I nodded silently, beginning to wonder how well Igor 2 knew these folks and whether that explained some of his remarkable effectiveness. I quickly turned to another subject. "The women—they are all so . . . so attractive. . . ."

"They are all whores," announced Igor. "They are very well paid by these men. The most beautiful women in Minsk are here and making great money. I know a lot of them. . . ."

I think it best to leave this subject at this point, although I must add one direct observation of my own—made from a suitable distance, of course: These girls certainly did not fit the stereotype of the heavy-jowled, coarse-featured Soviet woman which I have carried around with me most of my life. I suppose I have been victimized by all those pictures of stout old women sweeping the streets of Moscow while singing the praises of Lenin at the top of their lungs. In any event, Nancy protected me from having to undertake any more detailed investigation of this particular feature of Minsk society.

During mealtimes, Igor 2 would often entertain us with jokes or stories. Even without a jog from my notebooks, one bright little fragment still sticks out of the sands of my recollections: One day at lunch in Minsk, Igor notices someone lighting a cigarette. He gestures toward the man and, in a serious tone, tells us that the au-

## Zona

thorities are planning to manufacture an entirely new brand of cigarettes. Efforts are underway to plant tobacco in the Forbidden Zone and use the crop to manufacture luxury class high-priced cigarettes to be called "Chernobyls." On each pack, unlike the usual Surgeon General's warning in the U.S., will be the following notice: "The Soviet Ministry of Health warns you *for the last time* that cigarette smoking is dangerous to your health. . . ."

By now, each of our days has become a dazzling and ever-changing kaleidoscope of encounters with heads of ministries, directors of laboratories, scientists, physicians, political activists, opportunists and victims, heroes and crooks. Under the pressure of necessity, Nancy has become a quite skilled and certainly field-tested videographer—a veteran of covering scores of meetings and other events. My usually rather shy partner is often willing to shove a video camera close into the face of anyone, even a deputy premier, to get the right shot. . . . Ah! Another pretty little scrap of memory—out of sequence, but indulge me: I hold a private meeting with a small group of high-level political leaders in the blocky white marble Parliament Building in Kiev. Nancy is dutifully capturing the proceedings on tape by quietly prowling around the fifty-foot long conference table to get the best angles. As is Soviet custom, there are trays holding bottles of foul-tasting mineral water, glasses, napkins, and nicely fashioned bottlecap openers strategically positioned every eight feet or so along the enormous and highly polished table. The meeting ends and my wife and I are descending the broad marble steps toward our waiting car. "Look what I've got," she whispers to me holding out her hand as if she is passing me a state secret.

"Here, take it." I look at what she has given me and I burst into laughter. My lovely and assiduously law-abiding wife has swiped an official parliamentarian's bottle opener. "I couldn't help myself," she pleads guiltily. "It was just too good a souvenir. . . ."

It is time to plunge directly toward ground zero. We board a train out of Minsk, a *much* cleaner one than we had taken previously. The plan is to spend the night at Gomel and then proceed onward into the Forbidden Zone. Gomel surprises me—a bustling city full of life. It does not look anything like the horror I had

### *Zona*

created for myself at 3:00 a.m. during that nightmarish ride up to Minsk. But in Gomel, there is still a Golem, a radioactive one, invisible and subtle. Paradoxically, one of the most striking memories I have of Gomel is of a night club visit that was arranged for us on the evening of our arrival. The dark room was festive, the live music was sparkling, and the nightclub acts were good. Some of them might even have survived here in the United States. As in Minsk, the women of the performance troupe and around the room were as attractive and as well-coiffed as any you might see on the streets of Paris, London, New York or Chicago. As we applauded and talked and laughed, it was difficult for me to reconcile my feelings. Aside from the Zona itself, rain and wind conditions had conspired to make the Gomel region the area hardest hit by the fallout from the smoldering fires of Chernobyl. But that night club scene taught me something: Even radioactivity cannot stop laughter forever.

We hold an evening meeting with a dozen scientists and politicians. The subject is Gomel. The intensely earnest Director of the Byelorussian Radiology Institute is briefing me: It is July 1986. The radiation rate in Gomel is two roentgens per hour. A short-term total dose of 400 roentgens is sufficient to kill half of the human beings exposed to it. A short-term dose of 600 roentgens to the whole body generally is enough to kill everyone. One quarter of Byelorussia is covered with heavy contamination. The number of settlements in the so-called heavy and extreme contamination range is over 330. The Director states his opinion that there is plutonium all over the southeast of Byelorussia potentially affecting two million people. He observes dryly that in World War II, one in every four Byelorussians was killed by the Nazis. In 1986, one in four people lived in what he termed dangerously contaminated areas. Because of contamination and destruction and burial, 15 percent of the forest land of Byelorussia is lost. The economic impact, as he estimates it up to 1990, is 80 billion rubles, which amounts to eight times the GNP of his nation. His voice drones. The demographics of Byelorussia are still shifting. People are still leaving their homes. He grieves for the loss of their cultural heritage. Places that were once dear to Byelorussians are no longer accessi-

ble. On and on he goes with his list of the legacy of Chernobyl. The water, the birds, the wind, the crops—all are serious health risks in his eyes and will remain so. He declares flatly that 90 percent of the people do not want to stay in Byelorussia any longer and that 70 percent testify to declining health. I listen with great interest, respect, and sympathy but a small quiet voice inside me warns me, as it often has through these weeks: Though Chernobyl is unquestionably the worst peacetime nuclear disaster thus far in human history, it is in the tragic self-interest of the victims to maximize its apparent impact. American and international estimates of the physical and ecological consequences of the event differ wildly from what I was hearing. The truth, I suspected as I sat and listened and as I still suspect, lies somewhere in between.

There is, however, one fundamental aspect of the catastrophe which, to me, is as unassailable as it is unquantifiable:

This old shard remains very sharp-edged and ready to wound. I see it in almost every face shimmering before me as I write these words. To ordinary people, radiation is a fearful force unconnected to anything in their experience and foreign to their imaginations. An earthquake, whose consequences can be terrible, can be understood at a glance. A flood, whose destructive results can last for months or years amid the ruined walls of beloved places, at least *is of this world*. A war, whose casualties can be counted with awful certainty by relatives and friends, can finally be buried by the passage of time. But invisible and imponderable and despite all the laughter, the threat of radiation, whether justified or not, can live on as an everyday and unrelenting terror. Some of the Soviets have a word for this: It is not a very elegant description, but it is the best they have been able to come up with. In English, the word translates as "radiophobia." It is the Golem in Gomel and a thousand other places. Every illness, every grotesque animal or human mutation, every dizzy spell, any perceived deterioration or mental failing is inevitably connected to the presence of strontium-90, cesium-137, and plutonium. Researchers in the former Soviet Union have long struggled to establish a relationship between the stress of radiophobia and an hypothesized deterioration of the immune systems of whole populations. But there are no adequate statistical



## *Zona*

baselines from before the time of Chernobyl so they can only plead their cases, sometimes with tear-filled eyes, hoping to convince others with arguments of plausibility rather than fact. Of the social, emotional, and psychological destructiveness of radiophobia, however, there can, in my opinion, be no doubt.

There are some who react to the ubiquitousness of radioactivity in their surroundings with either resignation or bravery. It is hard for me to distinguish which descriptor is the more appropriate: A crooked old lady in her 80s, her spine bent with the burden of the years and disease. She lives in a one-room hut just at the edge of the Forbidden Zone. A few bits of charcoal are burning in a fireplace the size of a shoebox. With extraordinary dignity, she shows us through her almost bare little shelter. She offers us tea. She tells us that she moved away but she decided she would return to die in her own home. We have already repeatedly heard tales from others of how, after Chernobyl, hundreds of thousands of people were moved from their homes to supposedly "better" places to live. In the new places, thousands of these people were treated as true lepers. The villages to which they were sent would not even allow them to bury their dead in the local cemeteries for fear of the radiation plague they carried. After a time, many of these evacuees returned illegally to their original villages deciding that the slow death they assumed awaited them at home was preferable to what they found out among their terrified countrymen.

We leave the old woman and go to another village in a supposedly evacuated area of high contamination. At a hovel not much larger than the one we have just left, we walk in, apparently unannounced, upon a young girl, certainly no more than 20, who is sleeping in bed with a baby a few months old. Still another hut: A man in his 60s and his work-worn wife greet us. Igor 2 and our escorts explain who we are and why we are there. As usual, I am carrying air samplers and radiation rate meters. The gnarled, sad-eyed farmer immediately beckons to me. The interpreter explains that the man wants me to do something for him. I, of course, agree to do whatever I can. He leads me out of the little main room of his home and into a small lean-to immediately outside. It is November and it is cold. In the improvised cold-storage

cubicle he shows me the carcass of what I learn is their last pig. They have had to slaughter it for food. It is all they have left. The farmer looks at me with the pleading eyes of a supplicant and asks me the question: "Is my pig safe to eat?" I think to myself that the pig has foraged all its life on heavily contaminated ground. We have already found many places where there is no acute danger to privileged visitors like ourselves who come and go in hours, days, or weeks, but long-term residence is a different matter. What can I possibly say about this pig? I already know that where the rain has been running off the roof of this little house there are concentrations of radioactivity which are still 100 times or more above normal background. And I also know that the biological and environmental phenomena which determine what is in that pig's carcass are complicated beyond my powers of analysis.

I think for a moment about the question I have constantly pondered throughout the trip: What about plutonium particles? These so-called hot particles could be resident in large or small quantities in the lungs and other tissues of thousands of humans in the former Soviet Union and also in the flesh of that pig. The long-term implications of hot particles remain an open issue. They worry me. My American colleagues feel fairly confident that data from plutonium workers in the U.S. suggest these hot particles may not be particularly troublesome. Among the Soviets to whom I have spoken on the subject, hot particles are a topic they address with tension and hushed voices. They argue that a single microscopic particle locked in the right place in lung tissue or elsewhere can ultimately lead to devastating cancers. If there is one question that makes me uneasy about the dangers of our trip, it is the issue of plutonium particles. It may be decades before the definitive scientific answer is available. Sadly, lack of baseline information, poor personnel records and a lack of research resources may all prevent Chernobyl from contributing much to that answer, whatever it turns out to be.

I stare silently at the pig carcass. My instruments cannot do the types of measurement required to tell this man that his meat is safe to eat. I think about how many pairs of eyes I have confronted filled with thinly veiled fear as people have asked me, a supposed-

### *Zona*

ly reliable outsider, my opinion of their personal safety. Most assuredly, these people do not trust their governments or their own scientists. But what am I to tell this man? I try to be cool and analytical. The man and woman are no longer young. It is the dead of winter. It is obvious they have little food. What food they might get from elsewhere, for example from the stores which no one but the locals will patronize, is just as likely to be contaminated as this pig. Male life expectancy in the area is below 60 years. Neither of these two suffering souls is likely to live more than another decade or so—probably not long enough for any effects to show up. I answer the man's question. "My instruments," I say, "are not able to make exactly the right measurements, but if I were in your position, I would eat the pig." As the interpreter finishes telling him what I have said, his face breaks into an enormous yellow-toothed smile and he slaps me on the shoulder. He turns to his wife and says something the interpreter does not translate. We leave his hut.

I turn to another page in my notebook. . . .

Our little van is scuttling along the deteriorating concrete of a narrow two-lane road. The Forbidden Zone and Chernobyl Reactor Number Four, in its crumbling concrete sarcophagus, are just over 18 miles away. Behind us, I can see the barbed wire and the young soldiers still ostentatiously brandishing their weapons at a preliminary guard gate. My radiation survey meter tracks with the forest line—up when the trees are near the road—down where they have been cleared away. But the rates are nothing to worry about—maybe five to ten times what I saw in Chicago when I checked out our gear. At the official entry to the 30-kilometer zone, we change to a large badly mistreated bus. Our little party is the only one aboard except for the driver and a studious-looking man in his forties who introduces himself as Nicolai Petrov. He is to be our guide through the invisible jungle of radioactivity which lies ahead. We soon learn his history. He has worked as an engineer at Chernobyl since well before the accident. He has stomach cancer, he tells us, and does not expect to live too much longer.

We pass the inner zone boundary gate at 10 kilometers. Count rates are around 15 times normal. There are plenty of places hun-

### *Zona*

dreds of kilometers from Chernobyl where they are much higher.

The levels go to 20 times normal. Now we are a thousand meters from the Administration Building and the forbidding grey concrete of the tomb of Reactor Four. Rates are 40 times normal—we are absorbing roughly two ten-thousandths of a roentgen per hour. A cumulative *yearly* external dose of five roentgens is acceptable, given all the factors involved; so, except for the perpetual hot-particles question which is my own little version of radiophobia, I am not concerned. Nevertheless, it is cold comfort to know all workers at Chernobyl—perhaps a thousand people—are getting double and sometimes quadruple hazard pay.

The bus slides to a stop in the shadow of the structure housing four huge reactors—three of which are still operating. We are hustled through hand-and-foot rad monitors and then up the stairs to the administrative offices. I notice the marble stairs are covered with grime. Blackish dust has collected in all the corners. On the fly, I stick my own Geiger counter probe down into one dirty corner. Nothing serious. I take a contamination swipe with a piece of filter paper and continue up the stairs. A few hours later, when we exit the building down those same stairs, they are shiny and clean.

We spend the entire morning with the Director of Chernobyl—a man from Moscow who assumed his job after the accident. He is courteous and informative. He has a pat party line. I ask many questions. As the discussions enter embarrassing areas, he shows increasing discomfort, then quiet hostility. Finally, he sums up his position: Despite the opinions of outsiders and even the Ukrainians or Byelorussians, given the changes they have made, he feels “the Soviet Union has a moral and technical right to use the three remaining reactors at full power for their full operating life of 25 to 30 years.” In point of fact, the Chernobyl-type reactors, of which there are more than a dozen still operating, are dangerous and unstable beasts whose design integrity was *severely* corrupted by a headlong desire to maximize plutonium output for military purposes. In these post-cold war times, they are absolutely vital to the energy budget of Russia and its former territories so

### *Zona*

they cannot be abandoned. But by Western standards, they can never be made safe. Thus, Russia and its neighbors are in a terrible nuclear vise. The U.S. and Europeans are helping throw small patches over some of the problems, but the odds of another major reactor disaster in what was the USSR are far too high for comfort.

We leave the Director's office, have the usual abundant lunch, and take a tour of the external grounds. My eyes are frequently on my survey meter. Nicolai, our guide, reassures me. Do not worry, he says, he will keep us on safe paths. It is like walking on narrow invisible planks. Distance, time, and shielding are the best weapons against radiation. The paths lead through areas where the contamination has been bulldozed away, or buried, or both. They offer comparatively safe passage through a dangerous sea. We walk rapidly.

We gaze up at the decaying sarcophagus now full of holes and tons of nuclear fuel melted into black glass and frosted with intensely radioactive dust. The workers call the structure "Helen" and the question eternally on their minds is what is going on behind Helen's disintegrating walls. A kind of suicide team of workers has been going inside from time to time to look. Like a bird transfixed by a snake, these men seem to develop a grotesque and addictive fascination with the invisible death they confront inside. They *want* to go in to face what is waiting there eyeball-to-eyeball. It is not a team we wish to join.

We re-enter the still-operating portion of the Chernobyl Power Station and don the usual anti-contamination gear. I am so loaded with air samplers, survey meters, dosimeters, notebooks and cameras that I bulge under my disposable paper clothing like a lumpy walrus. Nancy, video camera in hand, somehow manages to look like she is modeling the latest avant garde styles.

We enter the long instrument-filled Control Room of Reactor Three to meet with operating crews. The men are cooperative but tense and careful about what they say. Immediately next door is the abandoned Control Room of Reactor Four still haunted by the awful mistakes which occurred there on that final fatal morning in the spring of 1986.

We leave the Control Room and rush down several flights of

### *Zona*

stairs to the base level of the building. Then we walk rapidly through an almost endless corridor completely lined with plastic sheeting for easy decontamination. Finally, we arrive at a small grey steel door. It is the boundary of Hell. Behind that door is the interior of Block Four. Four TV cameras and monitors have been installed inside by the suicide team to provide information on what is happening deeper in. I, of course, wonder why they didn't run the cables out to a safer area but I do not pursue the question. There are many forms of censorship. Nicolai says a trip inside to see the monitor images costs at least four roentgens and suggests we not do it. I think about the dust and plutonium particles and agree. We will go no farther.

Beside that final door is a sculpture—a large bronze bas-relief of a man half-melted into the wall and struggling as if to hold back some overwhelming force. It is a memorial in tribute to the reactor crew who died horribly trying to regain control of the raging core of Reactor Four. There are fresh flowers nearby. . . . There are *always* fresh flowers there. . . . Somehow, it seems so reassuring that fresh flowers are there . . . a small bit of beauty even at the doorway of Hell.

And now, though our trip is far from over, it is time to close my notebook and let the sand settle again over the few scraps of recollection I have retrieved. In the many pages I have not turned are countless other memories. Some are full of pain, others full of laughter. They rest there, patiently waiting both for Nancy . . . and for me.

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