THE WRATH OF KHAN

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How A. Q. Khan made Pakistan a nuclear power—and showed that the spread of atomic weapons can't be stopped

Rawalpindi is a city of two million residents on the northern plains of the Punjab, in Pakistan. It is a teeming place, choked with smoke and overcrowded with people just barely getting by. A large number of them live hand to mouth on the equivalent of a few hundred dollars a year. Much of their drinking water comes from a lake in the peaceful countryside north of town. The lake is surrounded by tree-lined pastures and patches of sparse forest. The navy of Pakistan has a sailing club there, on a promontory with a cinder-block shack, a dock, and one small sloop in the water—a Laser 16 with dirty sails, which sees little use. Though fishermen and picnickers sometimes appear in the afternoons or evenings, the lakefront on both sides of the promontory is pristine and undeveloped. The emptiness is by design: though the land around the lake is privately owned, zoning laws strictly forbid construction there, in order to protect Rawalpindi's citizens from the contamination that would otherwise result. This seems only right. If Pakistan can do nothing else for its people, it can at least prevent the rich from draining their sewage into the water of the poor.

But Pakistan is a country corrupted to its core, and some years ago a large weekend house was built in blatant disregard of the law, about a mile from the navy's sailing club, clearly in sight on the lake's far shore. When ordinary people build illegal houses in Pakistan, the government's response is unambiguous and swift: backed by soldiers or the police, bulldozers come in and knock the structures down. But the builder of this house was none other than Dr. Abdul Quadeer Khan, the metallurgist who after a stint in Europe had returned to Pakistan in the mid-1970s with stolen designs, and over the years had provided the country—single-handedly, it was widely believed—with an arsenal of nuclear weapons. Though he worked in the realm of state secrets, Khan had become something of a demigod in Pakistan, with a public reputation second only to that of the nation's founder, Muhammad Ali Jinnah, and he had developed an ego to match. He was the head of a government facility named after him—the Khan Research Laboratories, or KRL—which had mastered the difficult process of producing highly enriched uranium, the fissionable material necessary for Pakistan's weapons, and was also involved in the design of the warheads and the missiles to deliver them. The enemy was India, where Khan, like most Pakistanis of his generation, had been born, and against which Pakistan has fought four losing wars since its birth, in 1947. India had the bomb, and now Pakistan did too. A. Q. Khan was seen to have assured the nation's survival, and indeed he probably has—up until the moment, someday in a conceivable future, when a nuclear exchange actually occurs.

In any case, by the time he built the house on the lake, he believed wholeheartedly in his own greatness. In his middle age he had become a fleshy, banquet-fed man, unused to criticism and outrageously self-satisfied. Accompanied by his security detail, he would go around Pakistan accepting awards and words of praise, passing out pictures of himself, and holding forth on diverse subjects—science, education, health, history, world politics, poetry, and (his favorite) the magnitude of his achievements. As befits such a benefactor, he would also give out money, of which he seemed to have an unlimited supply, despite the fact that he was a government official with a government official's salary and no other obvious means of wealth; he bought houses for his friends, funded scholarships, set up his own private charity, made large donations to mosques, and bestowed grants on Pakistani schools and institutions, many of which duly named themselves or their buildings after him. To understand Khan correctly—which to some degree is to understand the spread of nuclear arsenals beyond the traditional great powers—it is necessary to recognize that his largesse was not merely a matter of self-aggrandizement. He has been portrayed in the West as a twisted character, an evil scientist, a purveyor of death. He had certainly lost perspective on himself. But the truth is that he was a good husband and father and friend, and he gave large gifts because in essence he was an openhearted and charitable man.

As to why, therefore, he insisted on building a weekend house that drained into Rawalpindi's drinking water, the answer is indeed twisted, though in a standard Pakistani way: the attraction was not in the setting on the lake (there are prettier lakes nearby) but, rather, in the open defiance of the law—an opportunity for the display of personal power. In a country whose courts have been made captive, and whose most fundamental laws have been systematically ignored by corrupt civilian governments and successive military regimes, once wealth has been achieved there can be no more gratifying display of success than such a brazen act of illegality. Khan's house on the lake served as a barely coded message, and one that was universally understood by Pakistanis at the time. It was a public brag. People did not disapprove of Khan for what he had done. Even in Rawalpindi they tended rather to admire him for it. It remained illegal to build on the lake, and as a result, by twisted logic, the restricted property there became some of the most sought after in the region. A. Q. Khan had pioneered the ground. Within a few years other houses had been built near his, perhaps a dozen in all, and each for the same reason—because of the extraordinary influence it took to get away with such a public crime. Some of the builders were generals. Some were Khan's associates from the secret laboratory. All of them derived additional glory from their proximity to the beloved Khan.

Then for Khan, in January of 2004, the good life came crashing down. He was sixty-eight at the time. U.S. agents had intercepted a German ship named the *BBC China* carrying parts for a Libyan nuclear-weapons-production program, and Libya, in subsequently renouncing its nuclear ambitions, had named Pakistan, and particularly the Khan Research Laboratories, as the supplier of what was to be a complete store-bought nuclear-weapons program. The price tag was said to be $100 million. At about the same time, it was revealed that the Pakistani-run network had provided information and nuclear-weapons components to Iran and North Korea, and had begun negotiations with a fourth

country, perhaps Syria or Saudi Arabia. The current dictator of Pakistan, General Pervez Musharraf, denied any personal knowledge or governmental involvement, and with his masters in Washington, D.C., looking sternly on, accused Khan of running a rogue operation, outside the law. It was theater of the diplomatic kind. But Musharraf was an unconvincing actor. In the context of Pakistan he might as well have expressed surprise that Khan had built a house on the shores of a drinking-water supply.

Khan's top lieutenants had already been detained. Now Khan himself was arrested—taken away by plainclothes security agents who came in the night and drove him to a secret location for a few days of questioning and persuasion. An agreement was reached, and on February 4, 2004, in a stage-managed event, Khan appeared on television and made a public confession, in which he apologized to the nation and absolved the military regime of involvement. Musharraf called Khan a national hero for his earlier work, and then pardoned him and confined him to house arrest at his grand Los Angeles—style residence in the nation's tightly controlled capital, Islamabad, a short drive north of Rawalpindi. Khan has been there ever since, in isolation with his European wife, surrounded by guards and security agents, cut off from contact with the outside world, not allowed to read the newspapers or watch television, let alone to use the telephone or the Internet, and held beyond the reach of even the intelligence services of the United States. The intelligence services would like to debrief him, because of the likelihood that much of the network he established remains alive worldwide, and that by its very nature—loose, unstructured, technically specialized, determinedly amoral—it is both resilient and mutable, and can resume its activities when the opportunity arises, as inevitably it will. Pakistan has mounted its own investigation, and is parceling out some information to the United Nations' International Atomic Energy Agency, the IAEA, in Vienna. But for obvious reasons the Pakistani regime cannot allow deep scrutiny to occur, and neither, out of perceived geopolitical necessity, can the current leaders of the United States.

Khan therefore remains an enigma—a man who may die in isolation, still carrying his secrets with him. Some news does filter out about the conditions of his captivity. He has aged considerably, and has lost weight and sickened, but apparently he is not being poisoned. After decades of soft living he suffers from various physical ailments, including constipation and, more significant, chronic high blood pressure, which led last summer to a brief hospitalization. He is also deeply despondent—convinced that he served his nation honorably, and that even as he transferred its nuclear secrets to other countries, he was acting on behalf of Pakistan, and with the complicity of its military rulers. He sleeps poorly at night. Last spring he managed to slip a note out to one of his former lieutenants. It was a scribbled lament in which he asked about General Musharraf, "Why is this boy doing this to me?" The answer seems obvious: it is a requirement for maintaining power. Ordinary Pakistanis remain on Khan's side. But out of self-protection the elites must turn away from him now.

Even his longtime scribe, a journalist named Zahid Malik, who for years praised Khan in public, and published an adoring biography of him in 1992, told me recently that Khan's arrest was necessary. We met in Malik's Islamabad office, at the newspaper he founded,

called *the Pakistan Observer*. He emphasized his loyalty to the military regime. He said, "After 9/11 Pakistan has emerged as a trusted and responsible ally of the West. Pakistan has adopted a principled position, you see, of working against terrorism, extremism, al-Qaeda, and all that. When Pakistan came to know of certain complaints, Pakistan reacted, you see, and very forcefully. Because as President Musharraf has been saying, and rightly so, whatever Dr. Khan did was his personal act."

He also said that Musharraf is rooting out corruption.

Since we were on the subject of law, I asked him what he knew about the formal basis for Khan's continuing detention. He did not directly answer. He said, "The government says it is because of his security. His own safety."

I asked, "Do you believe that yourself? That it's in his interest to be confined?"

Malik did not hesitate. Almost eagerly he said, "I think so, I think so."

It pays in Pakistan to be politically realistic. Khan's days on the lake are over, but other people are still out there building or expanding their houses. The most noticeable place is next door to Khan's. It is under construction, and showy in the style of an international hotel. Khan's house by comparison seems modest now, all the more so because it is shuttered and abandoned. Even on sun-filled days there is a sadness to the scene; in the afternoons when the wind comes up, there is nonetheless a stillness. Khan's garden, which slopes to the shore and was once his pride, is growing wild. He has a little speedboat beside a private dock, but it is open to the rain and is slowly swamping, settling nose-down into the water.

Khan's personal history is obscured as much by adulation as by secrecy. Something is known of his childhood. He was born in 1936, to a Muslim family in Bhopal, India—a city now known for the 18,000 deaths caused there by an accidental venting, one night in 1984, at a Union Carbide insecticide plant. Bhopal in the 1930s was split between Hindus and Muslims. The two groups lived in wary but peaceful proximity, despite growing sectarian animosity elsewhere on the Subcontinent. Khan was one of seven children. His father was a retired schoolmaster of modest means, with a thin, severe face, a white beard, and a turban. He was a partisan of the Muslim League, and when visiting the bazaar would warn like-minded men of Mahatma Gandhi's craftiness, and his ambition to annihilate the Muslims. These were of course common fears at the time, and they were reflected on the Hindu side as well. After World War II, as Great Britain rushed to withdraw from its burdensome colonial charge, and India's factions deadlocked over a power-sharing arrangement, a partition was decided upon that would carve a separate Muslim nation, called Pakistan, from Indian soil. The new nation would itself be split in two, between the Muslim-majority area of the west, primarily along the Indus River, and a smaller Muslim area far to the east, on the delta of the Ganges, in Bengal. It was an awkward exit strategy, but better than trying to control a full-blown civil war. A British official was sent from London, and with no previous expertise in the region, he drew up the boundaries within a few weeks.

Khan by then was a schoolboy, and according to Zahid Malik, he was a perfect one. He was devout, studious, and respectful of his teachers, and for good measure he was also a perfect son. All this and more, Malik believes, had been foretold. He writes that some months after Khan's birth his mother took the infant to a fortune-teller, known as the Maharaj, to look into his future. After performing calculations the Maharaj said, "The birth of this child will bring good fortune to his family. The child is very lucky. He is going to do a lot of good deeds in his life ahead. He will receive two kinds of education."

In the book Malik pauses to explain: *"Probably the Maharaj referred to the Science of Metallurgy and Nuclear Physics, or perhaps to a local and foreign education system."*

The fortune-teller continued, "Up to the age of eight months, he will suffer from stomach pain and a cough, after which he will have a long and healthy life. He will outstand in his family and will be a source of great pride and honor to his parents, brothers, and sisters. He is going to do very important and useful work for his nation and will earn immense respect." Furthermore, "Due to your son's good luck, you will soon be rewarded with great wealth."

But first there were troubles to endure. At the time of the Partition, in 1947, one of the greatest migrations in human history got under way, as over the course of a few months more than 10 million people—Hindus, Sikhs, and Muslims—fled the hostility of their old communities and sorted themselves out in the new nations. They moved by train and bus, and on foot. In the absence of governmental power India's social hatreds took form, and the migrants were attacked by mobs. The history is obscure and highly propagandized, but it seems that entire trainloads were massacred on both sides, that rape was rampant, and that several hundred thousand people died. In Pakistan perhaps seven million Muslims arrived, however traumatized.

Abdul Quadeer Khan was not initially among them: his parents chose to remain in Bhopal, where their lives seemed comfortable enough. But the city was no longer really their home, and over the subsequent few years its Muslim residents endured increasing harassment by their Hindu neighbors and the Hindu police. Three of Khan's older brothers and one of his sisters eventually left for Pakistan, and in the summer of 1952, having passed his matriculation exam, A.Q., at the age of sixteen, followed them there. He traveled across India by train, among a group of other Bhopali Muslims who were intimidated and attacked by Hindu railroad officials and the police. Jewelry and money were stolen from his companions, and people were beaten. Khan lost merely a pen, but the bullying marked him for life. The train ride ended at the border town of Mona Bao, beyond which lay a five-mile stretch of barren desert, and Pakistan. Zahid Malik describes Khan's crossing in the style of a founding epic. Carrying his shoes and a few books and belongings, the young A. Q. walked barefoot across the blistering sands to arrive at last in the Promised Land. He went to live with one of his brothers in Karachi. His mother arrived soon afterward. His father stayed in Bhopal, and died there some years later. Khan enrolled at the D. J. Science College of Karachi, where he excelled.

Pakistan by then was five years old. It was still a democracy, albeit a messy one. It had already fought and lost its first war with India over the disputed territory of Kashmir, a mountainous and predominantly Muslim region which for complex political reasons went to India at the time of the Partition. Pakistan had drawn the wrong lessons from its battlefield loss. It was born a poor nation and could not afford war, but its people hated India, and its military was on the rise. In 1958, on the pretext of threats to the nation, the army of Pakistan overthrew the democratic government and declared martial law. It is not known how Khan reacted. He was twenty-two, and in his final years in college. He believed, as many Pakistanis still do, that India had never accepted the Subcontinent's partition, and (as he told his friends) that Hindus were tricksters with hegemonic designs. It is possible, therefore, that he accepted the need for firm leadership. In later years he argued publicly against military rule despite the fact that he was providing Pakistan's generals with the ultimate weapon, and with that weapon, increased arrogance and strength. But in 1958 he was still essentially an apolitical young man, intent on studying science.

He graduated from college in 1960, and at the age of twenty-four became an inspector of weights and measures in Karachi. It was the sort of government job that might have lasted a lifetime, but Khan was more ambitious, and he secured the funding to pursue his education abroad. In 1961 he resigned from his job, and flew to West Berlin to study metallurgical engineering at a technical university there. His German grew fluent. He was lonely for Pakistan, but open to the experience of living in Europe, and to making new friends.

In 1962, while on vacation in The Hague, he met the woman who would become his wife. He had written a postcard home, and when he inquired about the price of a stamp, she was the stranger who happened by with an answer. Her name was Henny. She was a frumpy-looking girl of twenty, in glasses, who had been born in South Africa to Dutch expatriates, and had spent her childhood in Africa before returning with her parents to the Netherlands. She held a British passport, and though she spoke native Dutch, she lived in Holland as a registered foreigner. She and Khan corresponded for a few months, after which she took a job in Berlin to be closer to him. After a year they returned to Holland, where Khan transferred to a university in Delft to continue his studies in metallurgy. In 1963 he and Henny were married in a modest Muslim ceremony at Pakistan's embassy in The Hague. The marriage was performed by an embassy official and witnessed by the ambassador, as a standard service to citizens abroad. There was a small tea party, as was usual. Khan had no special connections to the Pakistani government, and was not yet working as its spy.

Nonetheless, he was making university contacts in the fields of engineering and applied science, and unintentionally laying the foundation for the European network that would help Pakistan to produce nuclear arms. Khan spent four years in Delft, where he earned a master's degree and learned to speak good Dutch. He and Henny then moved to Leuven, in Belgium, where he pursued doctoral studies at Catholic University under a professor named Martin Brabers—a metallurgist who was later to serve (innocently, he claimed) as an important consultant to the Pakistani nuclear-weapons program. In Belgium, Henny

gave birth to two daughters, two years apart. Khan said that he did not need a son, and that given the overcrowding of the world, two children were enough. He was not a brilliant researcher but a willing and hardworking one. Over the course of his studies in Delft and Leuven he published twenty-three papers and edited one book (with Brabers) on a variety of arcane metallurgical topics. His superiors were impressed, and so were his friends. To top it off, he was affable and outgoing and, as everyone agreed, just a very nice guy.

In 1972 he received his Ph.D. in metallurgical engineering, and having cast about for jobs, went to work in Amsterdam for a consulting firm called FDO. He might just as easily have taken a position at a university, a steel mill, or an aircraft manufacturer; he certainly was not setting out to build a bomb. But FDO happened to specialize in the design of machines called ultra-centrifuges—rapidly spinning tubes used to separate and concentrate certain isotopes in gasified uranium, in order ultimately to produce enriched uranium. FDO was a major subcontractor for a consortium called URENCO, which had been founded jointly by the governments of Britain, Holland, and Germany two years before. It had built a large state-of-the-art centrifuge plant in the Dutch town of Almelo, on the border with Germany, to enrich uranium for the nuclear-power-generation industry. The process there is in broad strokes not difficult to understand. The fissionable isotope known as U-235 exists in natural uranium at a concentration of only 0.7 percent; for the purposes of a power-generation reactor the concentration of that isotope has to be increased about fivefold, to at least three percent; the trick is to isolate and shed a similar isotope known as U-238, which is infinitesimally heavier. By spinning at very high speeds—electrically driven to 70,000 revolutions per minute, in perfect balance, on superb bearings, in a vacuum, linked by pipes to thousands of other units doing the same—this is what the centrifuge achieves. At URENCO the purpose was peaceful. One problem, however, with nuclear technology is that often the difference between a peaceful and a military purpose is merely a matter of the mind. Tangibly, the type of centrifuges in use at URENCO were (and are) capable of continuing the enrichment process past the commercial mark, and of concentrating the U-235 to more than 90 percent, which is the threshold necessary for a fission bomb.

As a result, the operational details at both URENCO and FDO were held as state secrets, and Khan—like other employees—needed to receive a security clearance before going to work there. This turned out not to be an obstacle. The Dutch internal security service ran a background check, and Khan was approved. Much has been made of this since then, as if the background check was too perfunctory; but Khan had strong references and a clean record, and even he did not yet know what was soon to be on his mind. He was thirty-six years old, a diligent husband, and the father of two. He moved with his family into a nice little house in a nice little town, and settled in to enjoy a quiet Dutch life.

But then history came chasing Khan down. It took the form of war. In the spring of 1971, after years of discriminatory treatment by Pakistan's dominant west, East Pakistan rose up in rebellion and began to agitate for independence as a new nation, called Bangladesh. The Pakistan military reacted brutally, and a terrible civil war broke out on the Bengali deltas and plains. The fighting went on inconclusively for most of the year, generating

huge casualties among civilians and sending several million refugees streaming across the borders into India. Pakistan's international reputation sank to an all-time low. Having gauged the geopolitical effect of this correctly, and emboldened by its friendship with the Soviet Union, India then seized the opportunity to dismember its foe, and mounted a full-scale invasion of East Pakistan with overwhelming force. The battles were short. Pakistan's once strutting army collapsed, and in December of 1971, at a humiliating ceremony in a stadium in Dacca, it unconditionally surrendered. Ninety-three thousand Pakistani soldiers were taken prisoner. For what it's worth, an independent Bangladesh was born.

Thirty-four years later it may seem obvious that the loss of Bangladesh was a blessing—but it is still not seen so today in Pakistan, and it was certainly not seen so at the time. The trauma was severe. The military regime fell, and Pakistan's greatest civilian leader—the democratically elected, populist, and some would say demagogic Zulfikar Ali Bhutto—assumed power. Bhutto was a visionary, and seems to have believed that he had been born to save the nation. The lessons he drew from the defeat were similar to those of almost all Pakistanis, and therefore probably to those of A. Q. Khan as well. Khan was still in Leuven, wrapping up his dissertation, but with a close eye on his homeland. Pakistan was engaging in a certain amount of introspection and self-criticism, but no sooner had the domestic purges occurred than the blame for Bangladesh shifted primarily to the outside. A fifth of Pakistan's territory and more than half of its population had been lost—and to crafty Hindus who now seemed certain to want to finish off the rest. To make matters worse, Pakistan in its time of need had been abandoned by its important allies, China and the United States, whose power had been checked by the Soviet Union, and whose nuclear arms had proved to be of no value at all. Only the Islamic nations had rallied to its side, but they were weak and disdained, and incapable of providing much beyond symbolic help. When all was said and done, twenty-four years after the Partition, Pakistan seemed to be in mortal danger, and quite obviously could rely on no one but itself.

What Khan may not have known, but Bhutto certainly did, was that India was well on its way to possessing nuclear weapons. The intention to acquire them apparently dated back to even before the Partition, when Jawaharlal Nehru, looking forward to independence, said, "I hope Indian scientists will use the atomic force for constructive purposes, but if India is threatened, she will inevitably try to defend herself by all means at her disposal." In the literature on nuclear proliferation today, positions are staked out to explain why nations choose to develop nuclear weapons. Is it because of external threat and strategic defense? International prestige and diplomatic power? Bureaucratic striving? Populism, nationalism, and the need to impress constituents on the streets? In India it seems to have been all of the above, with added emphasis on strategic defense after India's humiliating 1962 defeat by China and China's subsequent test of a nuclear weapon in 1964. India's program was pursued in semi-secret, closely linked to a public program of nuclear-power generation and partially masked by it: it would not use enriched uranium as the fuel for weapons but rather would use plutonium, a byproduct of nuclear reactors that can be extracted from their radioactive wastes. On the receiving end the difference between enriched uranium and plutonium would not matter: the former had been used against

Hiroshima, the latter against Nagasaki, and either material suitably compressed in a few fission bombs could release enough energy to devastate Pakistan. Pakistan protested in capitals around the world, and asked for diplomatic intervention, but to no avail. Though the likelihood of an Indian nuclear military program was evident, no sanctions were imposed; and indeed, Canada, France, and the United States continued to help India with its nominally peaceful nuclear plans.

Pakistan had its own nuclear plans, though less well developed. In the 1950s President Dwight D. Eisenhower launched a since discredited program called Atoms for Peace, under which a benevolent United States, while ensuring world peace with its rapidly growing nuclear arsenal, would assist governments with technology and training in the development of nuclear-power generation—as if such capacities were unrelated to the development of atomic bombs. Pakistan answered with the creation of the Pakistan Atomic Energy Commission, known as the PAEC, which initially had little interest in weapons, and to the extent that it progressed at all, did indeed concentrate on the possibilities for electric-power generation. By the mid-1960s, however, influential Pakistanis had begun to argue for nuclear deterrence against India. Bhutto, who was then the foreign minister, uttered the now famous remark that Pakistanis would eat grass if necessary, but they would have their bomb.

Given the desperate circumstances of Bhutto's subsequent rise to the national leadership, in 1971, it is not surprising that he set out almost immediately to make those dreams real. One month after the surrender of Pakistan's army in Bangladesh he called a secret meeting of about seventy Pakistani scientists under an awning on a lawn in a town in the Punjab. He asked them for a nuclear bomb, and they responded enthusiastically, promising delivery within an impossible five years. The largest obstacle, as usual, would be not with the design of a nuclear device but with the acquisition of the fissionable material to fuel it. At the meeting Bhutto placed responsibility for the weapons program with the PAEC, under an envoy to the IAEA named Munir Ahmed Khan. Munir Ahmed Khan was not related to A. Q. Khan, and would soon become his mortal enemy. Intending to exploit the radioactive waste from a small Canadian-built power reactor just coming on line, he set off, as the Indians had, on the path toward a plutonium bomb. Though Pakistan was not a signatory to international nonproliferation accords, the Canadians had required that their reactor be placed under IAEA controls: its fuel was to be accounted for before and after use, to verify that none was being diverted. Given his familiarity with the IAEA, Munir Ahmed Khan was not unduly concerned: presumably he believed that Pakistan could somehow secretly acquire additional nuclear fuel. His main need, therefore, was for a plutonium-extraction plant—a facility that the French eventually signed a contract to provide.

There is no evidence that A. Q. Khan was yet aware of the growing nuclear escalation on the Indian Subcontinent. But on May 18, 1974, an event occurred that left no room for doubt: beneath the desert of Rajasthan, near the Pakistani border, India detonated a fission device of roughly the same yield as the bomb that had destroyed Hiroshima. Prime Minister Indira Gandhi was watching. The desert floor heaved, and a message of success was sent to the capital, New Delhi. It read, "The Buddha is smiling." India

explained to the world that this had been a peaceful test, and asserted that a nuclear device is no more inherently threatening than any other explosive—that the character of a device depends on its intended use. The world was unconvinced, but did little in response.

Far away in Amsterdam, A. Q. Khan believed that the Buddha had smiled in anticipation of Pakistan's death. He had been working at FDO for two years, and with the access he had found to the URENCO centrifuge technology, he realized that by chance he was in a position to help Pakistan face the threat. Apparently on his own, he decided to take action. It is said that soon after the Indian test he sought out a couple of senior Pakistani engineers who were visiting Holland to buy a wind tunnel, but when he mentioned his background and expressed his desire to return to Pakistan to help develop its nuclear capabilities, they discouraged him, saying that his expertise would not be appreciated and he might not even be able to find a job. That particular story is typical of those Khan later told (with increasing rancor) to bolster his heroic self-image—Khan as the national savior, struggling against the complacency, if not outright treachery, of nearly everyone else—but the story is plausible enough, perhaps, to be true.

His next move was more aggressive. In the summer of 1974 he sent a letter to Prime Minister Bhutto, presenting his credentials, summarizing the purpose of centrifuges, and again volunteering to help. Bhutto responded through the embassy in The Hague. The two men met in Karachi in December of 1974, after Khan and his family arrived for a holiday. Khan argued for a Pakistani effort to enrich uranium—a route to the bomb that, he assured Bhutto, would be faster than Munir Ahmed Khan's pursuit of plutonium reprocessing, then under way. The plutonium project was troubled, because the Canadians had responded to the Indian test by beginning to withdraw their support for the Pakistani reactor they had built. Pakistan had expressed outrage, but could not escape the fact that Bhutto had effectively renewed his call for a bomb. Munir Ahmed Khan and his engineers at the PAEC believed that they could run the reactor without Canadian assistance, and they insisted that with the French extraction plant in the offing, Pakistan should stick with its original plan. Bhutto did not disagree, but he saw the advantage of mounting a parallel effort toward enriched uranium, and decided on the spot to place A. Q. Khan in charge.

And Khan was a self-starter. Even before the go-ahead from Bhutto, he had gotten to work. For sixteen fruitful days in the fall of 1974 he had stayed in Almelo on a special assignment to URENCO, where he had helped with the translation of secret centrifuge plans from German into Dutch, and in his spare time had walked freely through the buildings, taking copious notes—in Urdu. Some of the places he had visited were nominally off limits to him, but not once had he been challenged. A few people had asked him what his notes were about, and he had answered, half truthfully, that he was writing letters home.

With Bhutto's approval, Khan now returned to Amsterdam to gather more information. It was early 1975. He was thirty-eight years old, and much liked at FDO. As was his habit, he arrived at the lab with postcards, sweets, and other little presents for the staff. Despite

the secrets held at FDO, the atmosphere there was even more open and relaxed than at URENCO, with no visible security and none of the culture of suspicion that governments might have wished to impose. One bin held discarded prototype centrifuge parts—components that were perhaps not quite within specifications—and employees were free to scavenge keepsakes from it to put on their desks. Either immediately before or after his trip to Pakistan, Khan began not merely to scavenge them but to take them home. Presumably, some of those components made their way to Pakistan's embassy, which had received instructions from Islamabad to help.

Thirty years later I met Khan's office mate of 1975, an FDO machinist and staff photographer named Frits Veerman, now sixty-two, who drove me to Almelo, on his first return to the URENCO site in all this time. Veerman turned out to be a typically moralistic Dutchman with a maddening manner, as a driver, of strictly respecting the speed limits, to the point of braking frequently to slow down. Riding with him was a rare form of torture not yet known to Pakistan. I soon understood that living with him would have been worse: his wife and children believed he was obsessed with Khan, and wished he would leave the subject alone. But Veerman had been marked by Khan's actions, and whether because of this brush with fame or because he was truly troubled by the spread of nuclear weapons, he could not stop repeating the story.

He told me that he and Khan had been close friends. They were fellow geeks, I suppose—at least to the extent that centrifuges seem truly to have excited them both. Whenever Khan discovered something interesting on the laboratory floor, or Veerman did, they would troop off together to study it and share their joy. They shared other enthusiasms as well. When the weather turned warm and women in Amsterdam took to walking around in scanty clothes, the two friends would go sightseeing through the city, in earnest appreciation of the female form. Khan in particular was easily smitten, and occasionally would wander off to ogle some woman despite Veerman's entreaties to return to work. I asked Veerman if he meant to say that Khan had frequented prostitutes. He answered as he often did to my questions about those times, with a bewildered and plaintive "I don't *know*!"—as if he couldn't be sure of anything anymore.

But Khan was almost certainly a good family man, and for that reason a better spy. Veerman was still a bachelor then, and sometimes was invited over for dinner. Henny was less gregarious than Khan, and a bit overshadowed by him, but she was gracious and polite, and the two girls were young and very nice. The family spoke English at home. Veerman would arrive with ten pounds of Dutch cheese, or more, because some of his relatives were cheese makers, and Henny liked cheese a lot. The meals typically consisted of barbecued chicken and rice. Khan had a special fondness for the chicken. The drinks were non-alcoholic. In the style of small Dutch towns, the curtains were left open at night and the illumination was kept high, so anyone passing on the street could see that inside the house everything was just right. Veerman believed nearly the same for a while, though on several occasions he noticed classified documents on a desk in Khan's home, in apparent violation of the lab's security procedures. Khan explained that Henny was helping with translations. He was so clearly unconcerned with hiding the documents away that Veerman assumed Henny was being paid, and therefore had been checked out

and approved. Sometimes other Pakistanis came for dinner. They did not explain their jobs. Much later, when Veerman himself was accused of having helped Khan, Dutch intelligence agents showed him photographs confirming that these men had come from the Pakistani embassy, and were its spies. It appears likely that at the very dinners Veerman enjoyed, blueprints and other documents were being collected and taken away. But everything seemed so aboveboard—so normal and brightly lit—that Veerman was mostly just glad to have this friend. He was probably also proud. The pattern was similar at the lab, where Khan formally and in writing asked Veerman to take detailed photographs of the centrifuges and their parts. Taking photographs was one of Veerman's regular jobs. And because he had a European sense of hierarchy ("Abdul was a doctor, and I was just a normal person—do you understand?"), he unquestioningly complied.

Finally, however, it was Veerman who suspected that something was wrong. He enjoyed vacationing in foreign lands, especially when he could lodge with local people and see life through their eyes. He was not much drawn to Pakistan, but when Khan suggested warmly that he should visit, and held out the promise that he could stay with Khan's friends and family, Veerman jumped at the chance. Khan suggested places to see, and provided Veerman with information about direct flights from London. Veerman began to make his plans. Veerman was of course more than a staff photographer: he was a highly specialized centrifuge technician, full of secret knowledge and useful skills. In retrospect it is obvious that Khan hoped to tangle him up or seduce him somehow, and to use him in the project to build a bomb. But then Khan made a rare miscalculation, if only of Veerman's sense of right and wrong: after a short delay, during which he must have consulted with Pakistani officials, he came back to Veerman with an offer to pay for the trip. Veerman was shocked, and immediately declined. He told me that suddenly a light lit up in his mind. Khan's wanderings at FDO and URENCO came back to him, as did the classified documents in Khan's home, his Pakistani guests, the frequent conversations he had conducted in Urdu on his office phone, the photographs he had requested, and his very enthusiasm for centrifuges. He remembered that Khan wore a large gold ring, and that once he had joked that when he had to run away, he could sell it and get home to Pakistan—he carried his ticket on his finger. Veerman no longer thought of this as a joke. He realized that his friend Abdul was a nuclear spy.

The stakes were obviously high. Veerman feared that if his suspicions were discovered, his life would be at risk. He invented an excuse not to visit Pakistan, and began gingerly to distance himself from Khan. But these were temporary measures at best; the next time Khan submitted a formal request for photographs, Veerman would have no choice but to disregard it, and would have to explain why. Furthermore, as a man trusted to handle state secrets, he believed that he had a moral responsibility to sound an alarm. The question was how. He had no proof, and was intimidated by the idea of making serious allegations against a man of much higher rank. As best he knew, neither URENCO nor FDO had procedures in place to handle such a case, or to ensure his anonymity.

He tried to ensure it himself. He went to a public phone and called the head office at URENCO, but was unable to get through to the director. He then sent the same message to the director of FDO, also without effect. Finally he took his concerns in person to his

manager at the laboratory. The manager was visibly skeptical. He later got back to Veerman, scolding him that such allegations were too serious to be made without proof, and advising him not to stir up trouble at the lab. FDO was overcome, in other words, by a sort of institutional inertia. Veerman assumed—and still assumes—that nothing was made of his warnings. Paradoxically, FDO's unwillingness to confront the problem provided Veerman with the anonymity he desired: to the end, Khan never suspected that his friend had turned against him. But at roughly the same time, the Dutch government learned that a certain Pakistani agent, working out of the embassy in Brussels, had attempted to buy a highly specialized centrifuge component, the knowledge of which seemed perhaps to have come from Khan. Highly specialized components are rare in the business of building bombs. The Dutch government quietly communicated its concern to the lab—acknowledging, however, that the evidence was ambiguous and inconclusive. In October of 1975 FDO finally roused itself and promoted Khan to a new and less sensitive job, which would keep him away from the centrifuge technology. Khan's stay in Europe had come to an end. He was never, however, under such pressure that he had to sell his ring and flee. Two months after his promotion, in December of 1975, he simply flew his family back to Pakistan on another holiday, and this time did not return.

He had succeeded by then in stealing the plans for the most advanced uranium-enrichment process known to the West. Such was the appearance of normalcy, however, that neither URENCO nor FDO quite woke up to what had happened. Initially Khan sent word from Pakistan that he had come down with yellow fever and would have to extend his stay into 1976; later he explained that he had found an important new job, and that regretfully he would resign from FDO, effective March 1. Relations remained friendly, in part because Khan showed no tendency to duck and hide. He may have been something of a sociopath, and from early on. In any case, such was his self-centeredness that apparently he felt no regret, even on a personal level, for the trust he had betrayed, and he refused to believe that decent people—for instance, his old friends in Europe—might consider that he had done something wrong. These attitudes predated his return to Pakistan. He had known enough while at URENCO to lie about the nature of his letters back home, and he must have had some sense that he might be subject to prosecution; but he was an effective spy largely because, for reasons of personality, he was such an open one. For their part, the managers at FDO remained confused. They knew that Khan was now involved in a large government project in Pakistan, probably in the construction of centrifuges. Nonetheless, they continued to communicate with him, and in 1977, having sent a representative to Islamabad, they went so far as to sell him expensive instrumentation originally designed for URENCO.

Khan continued to cultivate Veerman as a friend and a source of secret information. In January of 1976 he wrote Veerman, "Dear Frits, it is now almost a month since we left the Netherlands, and I am gradually beginning to miss the delicious chicken. Every afternoon I think: ask Frits if he feels like eating chicken." After another chatty letter, in which he extolled the spring beauty of Islamabad and renewed his invitation to Veerman to visit, he wrote twice again, and this time got down to business. In one letter, for instance, he wrote,

Very confidentially, I request you to help us. I urgently need the following for our research program: 1. Etches of pivots: (a) Tension—how many volts? (b) Electricity—how many amperes? (c) How long is etching to be done? (d) Solution (electrolytic) HCL or something other is added as an inhibitor. If it is possible, [I would be] grateful for 3-4 etched pivots. I shall be very grateful if you could send a few negatives for the pattern. You would be having negatives of these. 2. Lower shock absorber. Can you provide a complete absorber of CNOR [a type of centrifuge]? Please give my greetings to Frencken, and try to get a piece for me. You can ask for it, or get it in pieces. In any case I shall like to request you very strongly to send me a few pieces (3 or 4) of membranes, and a few pieces of steel springs that are used in the absorber ... Frits, these are very urgently required, without which the research would come to a standstill. I am sure you can provide me with these. These two things are very small, and I hope you will not disappoint me.

Veerman did not answer the letters. Instead, as a dutiful employee, he took them to his supervisor, who told Veerman that he should destroy them and that if he didn't, he would go to jail. Ultimately he lost his job, as whistleblowers tend to, because he was no longer appreciated at FDO. During the subsequent period of unemployment he was picked up by Dutch security agents belatedly following Khan's trail. The agents took him to a prison in Amsterdam, where representatives of various government organizations questioned him for two days. The questioning grew confrontational. According to Veerman, the agents accused him of spying, but backed down in the face of his outrage. He in turn accused them of having made a huge mistake in allowing this technology to escape. And for what—the financial benefit of a few companies?

They said, "You have made trouble."

He said, "No, *you* have made trouble! I was a technician with a security clearance, and I found a spy in my laboratory!"

"This is not your problem."

"Yes, it is. I have a top security clearance."

"Go home. You may not talk about this anymore. It is dangerous for Holland. Go home."

Veerman did go home, but he began talking to the local press. Word gradually spread, not only about what Khan had done in Amsterdam but, by implication, about what he was doing now. Veerman remained under surveillance by the Dutch security services for more than a year. Eventually he found a safe job in the bureaucracy of a health-insurance company, where he spent the rest of his working life.

Press reports about Khan's spying continued to emerge, and they provoked emotional responses from Khan and his friends, who believed by the late 1970s that a smear campaign had been organized in the West. In 1980 Khan responded to a report in the British *Observer* with a vitriolic letter to the editor, in which he wrote,

The article on Pakistan in the issue of 9.12.1979 by Colin Smith and Shyam Bhatia was so vulgar and low that I considered it an insult to reflect on it. It was in short words a bull-shit, full of lies, insinuations and cheap journalism for money and cheap publicity. Shyam Bhatia, a Hindu bastard, could not write anything objective about Pakistan. Both insinuated as if Holland is an atomic bomb manufacturing factory where, instead of cheese balls, you could pick up "triggering mechanisms." Have you for a moment thought of the meaning of this word? Of course not because you could not differentiate between the mouth and the back hole of a donkey.

Despite such transparent bluster and prevarication, and the fact that Khan had indeed obtained state secrets, the truth is that by European legal standards it was difficult to prove that Khan had been a spy. In 1980 the Dutch government issued an embarrassed report, concluding that Khan had probably stolen centrifuge designs but pointing out that the evidence remained weak and circumstantial. Indeed, three years later, after further investigations, when the Dutch finally prosecuted Khan, it was not for espionage but for the letters he had written to Veerman requesting classified information. "Attempted espionage" was apparently the best they could do. Khan was convicted in absentia, and sentenced to four years in prison.

Khan saw dark forces at play. Zahid Malik faithfully writes, "This court was comprised of three judges, and was presided over by a woman who was a Jew. Another of the judges was also a Jew. It looked as if this case was instituted under pressure from the Israeli Prime Minister, and its verdict was also written in Tel Aviv."

If so, the Zionist conspirators were uncharacteristically sloppy, because Khan was never properly served with the charges, as a result of which a Dutch court overturned the conviction two years later. Khan appeared on Pakistani television for the first time soon afterward. He said, "This case was false and *mala fide*. I am happy that it is all over, because my prestige, which had been affected, has now not only been vindicated, but all the allegations which were being leveled against Pakistan's nuclear program have also been quashed." Not even Khan could have quite believed these claims. But Khan was gloating. By then it was June of 1986, one decade after his return, and as the world was coming to recognize, Pakistan in that short time had already achieved the capacity to build a nuclear bomb. People had said that in such a place it could not be done.

W hen, someday, the nuclear arming of the world is nearer to being complete—when, say, a few dozen fourth-rate countries have been able to acquire such destructive power—people may still be blaming the Dutch, as they do today, for having allowed Khan to obtain such dangerous knowledge and run away. The fact of the matter, however, is that once the technology of nuclear weaponry became manifest in the ruins of Hiroshima and Nagasaki, in 1945, the spying that led to its subsequent spread was as difficult to prevent at Los Alamos and elsewhere as, later, at Almelo. By the time Khan began to steal from the Dutch, similar acts of intellectual "borrowing" had to varying degrees contributed to the acquisition of nuclear weapons by the Soviet Union, China, Israel, France, India, and white South Africa—and also to nuclear-weapons projects that were ultimately (and perhaps temporarily) abandoned in Argentina, Brazil, South Korea, and Taiwan. It is true

that Khan's success came as a particular shock, because it turned this runt called Pakistan into something like a runt with a gun. But to see that success clearly, and to understand the further proliferation that has resulted, it is insufficient to focus on the loss of state secrets, or to single out the Dutch.

Khan himself has accurately said that the designs he obtained in Holland were not nearly enough. Building the thousands of centrifuges that were necessary, and then putting them to use, required solving untold numbers of practical problems, and equipping a new industrial plant with technology that lay beyond the indigenous capabilities of Pakistan. Khan's solution, once he returned to Pakistan, was to buy the technology in bits and pieces from manufacturers and consultants in the West. He knew where to shop because he had kept names and addresses from his years in Europe, and he knew who might provide what, and why. Later he bragged that it was this knowledge, and not his so-called theft of designs, that counted most in enabling Pakistan to build the bomb. The market he worked was gray rather than black, because with few exceptions the equipment and materials he sought had multiple uses, and usually would trigger questions only if a nuclear purpose was openly declared. For the most sensitive items Khan used front companies, false end-user certificates, and third-country destinations to obscure the intended use; but generally he or his agents simply went out and bought the stuff. The list was long. Machine tools, magnets, exotic steel. Vacuum pumps, ball bearings, instrumentation of all kinds. The manufacturers who sold to Khan, like the European professors who signed on as his consultants, tended to be willingly naive and greedy. Those who were confronted by Western authorities invariably claimed to believe they were helping an impoverished country to pursue peaceful research. Pakistan was indeed an impoverished country, and all the more so because it was spending a fortune on this. I've been told that Khan was willing to pay two or three times the going rate for what he bought, as a premium for working fast and in the shadows. And having such money was fun. Spending it gave Khan power. He felt vindicated somehow that in the same nations where he was being pilloried as a spy, there were so many people who, as he described them, would come begging for his business. Nor did it escape his attention that one of those nations was Pakistan's former colonial master, and that the beggars now were whites. At times it was nearly enough to make a man glad for the nuclear success, next door, of all those Hindu bastards.

Khan particularly resented two of the traditional nuclear powers. Responding to criticisms of Pakistan's program, he wrote a bitter letter in 1979 to the German newsmagazine *Der Spiegel*, in which he said,

I want to question the bloody holier-than-thou attitudes of the Americans and the British. Are these bastards God-appointed guardians of the world to stockpile hundreds of thousands of nuclear warheads and have they God-given authority to carry out explosions every month? If we start a modest programme, we are the satans, the devils ...

He had overstated the numbers, but he was expressing widely held opinions, and indeed making a legitimate point. Since the 1960s the possession of nuclear weapons had been considered the exclusive prerogative of the five permanent members of the UN Security

Council—the Soviet Union, France, Great Britain, China, and the United States—with a special exception made for Israel, and with Japan and the rest of Europe tagging along unarmed but under the protection of the American or the Soviet nuclear umbrella. The inequity of this arrangement was formalized in 1970 (when Khan was still a graduate student) by an openly discriminatory global agreement: an American initiative known as the Nuclear Non-Proliferation Treaty, or NPT, which recognized the overlap between electric power generation and the construction of weapons, and attempted to place controls on the spread of fissionable fuel and nuclear technology. That treaty today, having at best slowed the emergence of some new nuclear-weapons states, still constitutes the foundation for nonproliferation efforts worldwide. It has four essential parts. The first prohibits the traditional non-nuclear-weapons states (or the 184 that have signed—India, Pakistan, and Israel never have) from attempting to build nuclear weapons. The second assures those same states that as a consequence of joining the treaty they have the right to acquire peaceful nuclear technology—subject, however, to intrusive IAEA inspections and controls. So far, so good—why insist on equity in the world if that lets the world go up in smoke? But the third part, which is an operational understanding, works as a subversive display of just the sort of political power that nuclear weapons can provide: it is a blanket exemption from any such international intrusion for the traditional "club of five." Finally, the fourth part is a feeble promise that the declared nuclear powers will themselves somehow, someday, disarm—standing down from power in a dream world without nuclear weapons, which no one can realistically expect to see.

In the West the weaknesses of the Non-Proliferation Treaty were understood from the start. For the treaty to have weight it would have to be backed by the threat of sanctions—but even then, given the willingness of governments to "eat grass" to acquire such military capabilities, it was unlikely to deter serious aspirants from pursuing the bomb. The solution, therefore, would lie in the complex realm of export controls—restrictions on the sale of nuclear-related materials and components that might appear to be for peaceful purposes (research, health care, power generation) but could be used for weapons development. Emphasis was to be put on technologies that would allow countries to become self-sufficient in nuclear fuels—on uranium-enrichment and plutonium-extraction plants. Exports would be allowed to countries that had joined the treaty, subject to IAEA scrutiny on the ground, but would be banned to countries that had refused to sign, like Pakistan. The reliance on the United Nations posed obvious operational problems: the IAEA was a politicized bureaucracy, awash in national jealousies, and staffed by functionaries who considered themselves to be in the business primarily of encouraging nuclear-energy development. Nonetheless, in the early and mid-1970s two groups of technologically advanced countries (diplomatic assemblies known as the Zangger Committee and the Nuclear Suppliers Group) began to meet to decide on the lists of restricted materials and equipment and to negotiate the tricky terrain of national implementation and cooperation between participating governments. Over the thirty ensuing years their record has been mixed. Though they have produced ever longer export control lists that have helped to slow the nuclear trade by forcing more of it underground, they themselves have been stymied by national bureaucracies, slowed by governmental reluctance to interfere with lucrative business deals, and frustrated by the

depths of global trade. As a result their lists have lagged behind the market they intend to regulate. And at no point have they been a match for energies like those of A. Q. Khan.

In fairness, Khan was an extraordinarily aggressive man. After his return to Pakistan, in December of 1975, he spent a few months within the confines of the Pakistan Atomic Energy Commission, but he was frustrated by its slow pace, and he angrily burst free. In a private conversation with Bhutto he accused the PAEC chairman—the despised Munir Ahmed Khan—of betraying the country. As he later remembered the conversation to Zahid Malik, Khan said to Bhutto, "Munir Ahmed Khan and his people are liars and cheats. They have no love for the country. They are not even faithful to you. They have told you a pack of lies. No work is being carried out, and Munir Ahmed Khan is cheating you." What he did not say, but at some point apparently believed, was that Munir Ahmed Khan had been turned by his tenure at the IAEA, and was actively subverting Pakistan's nuclear goals. Evidently Bhutto was too shrewd to be convinced, because he never took action against A. Q. Khan's enemies; but with nothing to be gained by frustrating Khan, and with perhaps some benefits to accrue from setting up a competition with the PAEC, he decided to give Khan full autonomy, and promised him a large and secret budget. He must have thought he was doing Khan a favor.

On July 31, 1976, Khan founded the Engineering Research Laboratories to set up and operate a centrifuge plant based on the stolen URENCO designs. The raw uranium was to be mined in central Pakistan, converted to gas, and sent to Khan to spin very fast. If anyone asked, the stated purpose was to produce uranium enriched merely to the level necessary for electric-power generation—albeit completely outside of IAEA verification and controls. The plant was to be built as a complex of industrial-looking buildings among low hills about forty miles southeast of Islamabad, in an out-of-the-way town called Kahuta, which could be locked down and guarded by Pakistani security forces. Because Khan felt that his nation's survival was at stake, he proceeded not sequentially but simultaneously on multiple fronts—hiring staff, laying out the installations, initiating the construction of the Kahuta plant, and setting up a pilot project elsewhere to resolve the practical intricacies of linked centrifuges and to make the first trial runs. This was a big operation. Ultimately he hired as many as 10,000 people. Most important, he launched the procurement effort in Europe and the United States.

The U.S. government knew very well what was happening; Bhutto had made no secret of his ambitions, and by conventional logic it made sense for Pakistan to acquire a nuclear bomb. As an element of Cold War strategy, Pakistan remained a U.S. client state, somewhat prickly under Bhutto, but supported by American aid, and still quite accessible to American diplomats and officials. It is reasonable to assume—and was always presumed within Khan's inner circle to be true—that the CIA had penetrated both the PAEC and Kahuta from an early date. Given the size of the programs under way, this would have been easy to do. The view from the inside was sobering: despite an assumption among European governments that Pakistan lacked the necessary technical expertise, it became clear that this effort was serious, and that it was likely to succeed. Such an outcome seemed all the more worrisome in Washington, D.C., because Bhutto had resentfully mentioned Christian, Jewish, Hindu, and Communist bombs, and the

possibility therefore existed that a Pakistani device would amount to more than a counterbalance to India—that it would be handled as a "Muslim" bomb to be spread around. Apparently other countries had the same idea, though with hope rather than fear: Libya and Saudi Arabia, for example, are both suspected of having funded Khan early on, probably with the expectation of a return. In any case, by the late 1970s, as Khan proceeded determinedly and American appeals to desist were rebuffed by the government in Islamabad, U.S. officials realized that the only chance they had to stop Pakistan from building a bomb was to take the supply-side approach—to block Pakistan's procurements abroad.

Blocking procurements within the United States proved to be relatively easy, because Khan had few American contacts, and U.S. export-control lists were already quite extensive—significantly more so than those that had been agreed upon by the international supplier groups. Moreover, deep within the customs and commerce bureaucracies, where such regulations are effectuated (or not) day to day, American officials, as representatives of a dominant nuclear power, tended naturally to agree on the importance of nonproliferation, and were alert to hints of violations that appeared in the paperwork that crossed their desks. As a result, though some transactions slipped by unseen, the U.S. government thwarted most of the attempted acquisitions from American suppliers.

The export-control record was altogether different in Europe, where constellations of companies were selling their wares to the Pakistanis, often with the tacit or explicit approval of their governments. In a breathless but generally reliable book titled *The Islamic Bomb*, published in 1981, the reporters Steve Weissman and Herbert Krosney tell a typical story of three of Khan's purchasing agents, who in 1976 went to a small Swiss company in a small Swiss town and proposed to buy its specialized high-vacuum valves for the express purpose of equipping a Pakistani centrifuge enrichment plant. The company dutifully checked with the Swiss authorities, who sent back a printout of their export regulations, including the list of restricted items as defined by the Nuclear Suppliers Group. Weissman and Krosney write,

Complete centrifuge units were listed, and could only be exported to [IAEA] safeguarded facilities, which the Pakistani enrichment plant was not. High-vacuum valves were not listed, even if expressly intended for a centrifuge enrichment unit. The valves might be necessary to the centrifuge. But, in the logic of the ... list, they were not "nuclear sensitive," and did not directly separate the two different uranium isotopes, uranium 235 and uranium 238.

The company, in other words, was informed that it could proceed with the sale, and so it did—as did others throughout Western Europe. In Holland, also in 1976, a Dutch company in the automotive-transmission business sold 6,500 high-strength steel tubes to Pakistan—tubes that could serve as the basic components of centrifuges. The Dutch government knew of the deal and advised against it, but the company sent their product anyway (initially claiming that the tubes were for agriculture), and argued that no export license was required by Dutch law. The argument was accepted, and further shipments

went through without delay. Ultimately there were several paltry prosecutions, including one that led to the conviction of a Dutch businessman named Henk Slebos for illegally exporting an American-made Tektronix oscilloscope in 1983. Slebos was a personal friend of Khan's, and one of his main European suppliers. He was sentenced to a year in prison, but never served the time, and continued brazenly to send equipment to Pakistan. Controls were so loose that for more than a decade Khan himself kept visiting Europe.

Such was the scene American officials faced in the global nuclear marketplace as they grappled with the inadequacy of the UN's multi-party approach, and tried through private entreaties to European governments to prevent the spread of nuclear weapons. They were undercut, as they are today, by the thousands of nuclear warheads that the United States insisted on retaining for itself, and the resentment that such an obvious double standard provoked even within countries such as Germany and the Netherlands, which were said to be direct beneficiaries of American nuclear strength. They did, however, experience a few successes—particularly in 1977, when they pressured the French into backing out of the lucrative agreement to provide Pakistan with its long-desired plutonium-reprocessing plant. The cancellation set back the PAEC's nuclear-weapons plans by a decade or more. In consequence it further legitimized A. Q. Khan, and helped him to pursue his alternative goals—but nothing could be done about that anyway. For France the cost of killing the deal was several billion dollars, because of the loss of associated contracts for French products such as airplanes and trucks. The decision was all the more difficult because, with its "*force de frappe*," France embodied the right (and perhaps the need) of independent nations to bear nuclear arms. Such was its ambivalence that it had refused to join the Non-Proliferation Treaty. (It would not join until 1992.) Nonetheless, as an established power pretending to diplomatic relevance, it had little choice but to back away once it was faced with evidence of Pakistan's ambitions. By American estimation France this time behaved well.

West Germany, however, did not. Thirty years had elapsed since World War II, the German economy was strong, and the government had embarked on an ambitious program of energy self-sufficiency, which was to be achieved largely through nuclear-power generation. Germany had joined the Non-Proliferation Treaty in 1970, but from the start it had been concerned almost exclusively with the provisions that promoted the rights of member states to acquire peaceful nuclear technology. In practice the German government did not rigorously differentiate between countries that were member states and countries that were not. In the mid-1970s it entered into a major nuclear deal with Brazil, which had not joined the treaty but agreed in this case to accept IAEA safeguards as if it had. Such safeguards were weak, and everyone knew it. Nonetheless, Germany was going to sell Brazil no fewer than eight nuclear reactors, a uranium-enrichment plant, a fuel-fabrication plant, and plutonium-reprocessing facilities. Presumably the centrifuges would be of the same URENCO design that A. Q. Khan was stealing for Pakistan at that very time. U.S. officials were angry, because they had indications that Brazil was secretly seeking a bomb. (So was Argentina, which had rejected the NonProliferation Treaty as "the disarmament of the disarmed.") But when the Americans took their concerns to Bonn, the Germans reacted skeptically, and said they would proceed with the deal. In Bonn an inside observer recently said to me, "The Americans said, 'Hey, *wait* a minute!

This is what we can show you.' And they showed the Germans a little bit of information. Apparently it was just enough to persuade the Germans that they were off the reservation." The Germans gave in and reluctantly let the Brazilian contracts drift. Fifteen years later both Brazil and Argentina, for domestic political reasons, formally renounced their nuclear-weapons ambitions.

But the Germans were increasingly restive. Reflecting a sentiment that was organic and widespread in Europe, they resented the disproportionate power of the United States, and suspected the Americans of wanting to use nonproliferation to corner the free-world market in nuclear fuels. The founding of URENCO was an act of resistance to such perceived domination. Moreover, resentment toward the United States was greatest not among the national policymakers, who could sometimes be swayed, but deep within European bureaucracies, among the ordinary diplomats and officials who transacted the daily business of government and were largely immune to American pressure. It was on that level—or lower—that the Pakistani purchasing network operated, and that the American attempts to stop Khan failed. The patterns were repetitive. Whenever American intelligence discovered that one company or another was about to export devices to Khan, U.S. officials would pass the information along in writing to their European counterparts in the expectation that the activity could be stopped. In some cases the Europeans refused to act because the sales were unambiguously legal. In many others interpretation would have been possible, and with sufficient commitment and energy the companies could have been approached and warned off. Instead, the Europeans closed ranks. Their attitude toward the Americans was them against us. The reports were slid into drawers, and the drawers were slid shut.

In Islamabad, A. Q. Khan was riding high. Such was the perceived importance of his work that he seemed safe from the political dangers even of Pakistan. His mentor Zulfikar Bhutto was overthrown in 1977, and later hanged, but the new dictator, General Zia ul Haq, proved to be just as committed to the bomb. By cutting off foreign aid for a year starting in September of 1977, the United States tried forcing Zia to cancel the French plutonium plan, but the effect was only to heighten Pakistan's nuclear resolve. People don't like being pushed around. In April of 1979 the United States tried for a second time, suspending aid because of Pakistan's nuclear activities—but only eight months later, on Christmas Day, the Soviet Union invaded Afghanistan, and suddenly it seemed to Washington that more-important issues were at stake. Aid was resumed and nuclear nonproliferation quietly de-emphasized, as over the following decade Pakistan bled the Soviets on behalf of the United States. Much has been written about the folly of that tradeoff—and certainly the wisdom of the Afghan war will be argued for years to come—but the truth is that nothing the United States had done or could feasibly do was going to keep Pakistan from arming.

Khan, for one, never doubted his success. As long as he was granted autonomy and the budget he demanded, he was going to build the bomb. It is believed that as early as 1978 he may have had a prototype centrifuge running, and have been able to show some increase in the concentration of the isotope U-235. Three years later, in 1981, the production plant at Kahuta was ready to start up, and with such promise that General Zia

renamed it the Khan Research Laboratories. This was the sort of gesture that made Khan inordinately proud. The work continued. There were difficulties with balancing the centrifuges, and with earthquakes and floods, but in just a few years Kahuta would probably have 10,000 centrifuges in place, and already a good number of them were linked and running. Around 1982 the plant achieved the first weapons-grade uranium, enriched to 90 percent or more; by 1984 it was producing enough fissionable material to build several bombs a year. Nor had Khan neglected the need for a warhead: his was an implosion device, based on a simple Chinese design, with an enriched-uranium core the size of a soccer ball surrounded by a symmetrical array of high explosives wired to a high-voltage switch to be triggered all at once. Soon he was going to work on a missile, too.

He had a problem, however, and it was poisoning his soul. Despite his repeated attempts to discredit Munir Ahmed Khan and his staff, the PAEC was still officially heading up Pakistan's nuclear-weapons program. They were going to restart their quest for plutonium reprocessing, which if successful would diminish the importance of Kahuta. Worse, they were already working on a missile, and they were developing their own warhead—one so similar to Kahuta's that Khan believed they had stolen his design. Khan fought back with transparent emotion, and increasingly in public. His surrogate Zahid Malik, for instance, published this description of Munir Ahmed Khan:

Although some of his loyal friends rank him as a good administrator (or a shrewd manipulator), nobody accepts him as a good scientist. He lacks moral values and is very devious. He can even be cruel where his personal interests are concerned. According to the authors of "The Islamic Bomb," Dr. I. H. Usmani had declared Munir Ahmed Khan a liar and a selfish person who disgraced Pakistan internationally by his conspiracies. According to these authors, he is a treacherous fellow, and time has also shown that he not only cheated Mr. Bhutto but also created a lot of problems for Pakistan in the development of nuclear power and capability. Mr. Goldschmidt, Director General of the French Atomic Energy Commission, said, "I never trusted anything Munir Khan said. He could lie while being charming. I never believed a word that he said."

The leaders of Pakistan must have smiled at such crude denunciations. The rivalry between the two groups suited them well. They heaped praise on A. Q. Khan, and allowed him to become wealthy. But they kept stringing him along.

Khan knew it, too, but apparently could not help himself. His ego was inflamed. He had developed such a need for power and recognition that there was little room for anyone else. It was frustrating to him that the weapons work at Kahuta was supposed to be secret: he could not shout to the world quite as loudly as he would have liked. In his interviews and speeches, which were increasingly frequent and long, he had a way of insisting that uranium was being enriched to only 3.5 percent, and purely for peaceful purposes, but then letting his pride get the best of him and proceeding at length to discuss the logic and technology of nuclear weapons. The pattern was strange. In part it stemmed from a deliberate position of nuclear ambiguity, similar to the Israeli choice to neither confirm nor deny; but to the extent that Khan kept talking and talking, it also reflected his

personal needs. He was poor at keeping secrets, because he acted too clever when he lied. He was too eager to claim credit. His denials were not intended to be believed. What he seemed to be saying was We have the bomb, and because of me.

By 1986 Pakistan had crossed the threshold, and was able to fabricate several nuclear devices. Within a few months it put its new strength to use. Toward the end of the year India mounted a large military exercise on the plains along Pakistan's borders. The exercise was dubbed Brasstacks, as in "getting down to …" Pakistan responded by mobilizing its own troops, moving the two countries again toward war, and then apparently issued a veiled nuclear warning. It took the form of an interview that Khan gave to a freelance Indian reporter at his house in Islamabad in January of 1987, during which, according to the reporter, he reiterated earlier boasts that Pakistan had succeeded in enriching uranium to weapons-grade levels, and added, "Nobody can undo Pakistan, or take us for granted … And let me be clear that we shall use the bomb if our existence is threatened." Publication of the story was delayed for several weeks while the reporter shopped it around, diminishing its immediate effect—and Khan later denied having said any such thing, accusing the reporter of being a typical Hindu hack. But in India a message had been received nonetheless, and it would resonate for years to come. There may have been other messages as well. Despite subsequent Pakistani denials, the Indians claimed they had been threatened in Islamabad, through diplomatic channels. Moreover, at the time when the opposing armies stood face-to-face along the border, and India was contemplating a pre-emptive strike, General Zia flew to an Indian-Pakistani cricket match in India, where he sat beside Rajiv Gandhi and, it is alleged, at one point leaned over and said, "If your forces cross our border by an inch, we are going to annihilate your cities." Whether or not he spoke those words, India soon withdrew its army. And by the time the crisis was over, whatever warnings had or had not been sent, somehow Pakistan had emerged as a nuclear-weapons state.

Zia died in a mysterious airplane crash in 1988, and Pakistan entered a decade of political turbulence during which it endured various corrupt and incompetent governments, generally with the army holding real power in the background. For a while the White House continued to certify, as it had since the start of the proxy war in Afghanistan, that Pakistan was nuclear-weapons free. Maintaining that fiction was an annual requirement for providing Pakistan with financial aid. But after the Soviets withdrew from Afghanistan, in 1989, the fiction no longer seemed necessary, and with concerns about nuclear proliferation again predominating, American aid was cut off. The cutoff saved U.S. taxpayers some money, but of course it was sapped of moral weight by America's own nuclear stance, and in Pakistan, as usual, it failed to achieve the desired results. For Khan the sanctions were a point of pride. He had never been particularly religious, but his position was increasingly Muslim and hard-line. A Pakistani general asked him if he minded the descriptions of him in the West as an evil Dr. Strangelove, and Khan answered accurately enough: "They dislike our God. They dislike our Prophet. They dislike our national leaders. And no wonder they dislike anybody who tries to put his country on an independent and self-reliant path. As long as I am sure that I am doing a good job for my country, I will ignore all such insinuations, and concentrate on my work."

And concentrate he did. In the face of increasing export controls in the 1990s, Khan expanded his global procurement network and took it largely underground. At Kahuta he continued to improve the centrifuge plant, to tweak the laboratory's warhead designs, and to develop an alternative ballistic missile to one being built by the PAEC. He also led the laboratory into the design and manufacture of a variety of conventional weapons, including surface-to-air missiles, anti-tank weapons, multi-barrel rocket launchers, laser range-finders, laser sights, reactive armor, minesweeping charges, and armor-piercing tank rounds. On the civilian side Kahuta launched into the manufacture of electronic circuits, industrial switches and power supplies, and compressors for window-mounted air-conditioners. In 1992 it even established a Biomedical and Genetic-Engineering Division. Furthermore, it began to hold seminars and conferences on topics related to the experience of enriching uranium, including six International Symposia on Advanced Materials; two International Symposia on Mechanical Vibrations; the International Conference on Phase Transformations; three Vacuum Courses, some in cooperation with the Pakistan Vacuum Society; and, finally, every bomb-builder's favorite, the National Conference on Vibrations in Rotating Machinery.

In other words, Khan was going great guns. And he was having fun. Pakistan's nuclear position remained officially ambiguous, but once the American sanctions had been imposed, Khan was freer to praise himself for what he had done. Word filtered through the streets until even ordinary people knew of this grand man, and some recognized him as he whisked by in his cavalcades, surrounded by loyalists and guards. Medals and awards were showered upon him, and every one of them he counted, and every one, he felt, was justified. Ultimately he received six honorary doctoral degrees, forty-five gold medals, three gold crowns, and, twice, the Nishan-i-Imtiaz, Pakistan's highest civilian award. He played his fame for what it was worth. This was the era when he began to buy houses and luxury cars, and to go around bestowing grants on hospitals, mosques, and schools. He shared his wisdom openly, on many public occasions. He sat on the governing boards of more than two dozen universities and institutes. He was personable, charming, and sometimes apparently humble—though in the way politicians can be, without being humble at all. When people visited him at his office, he gave them pictures of himself. When those people were reporters, he allowed them to fawn.

REPORTER: You seem to be very fond of learning different languages. In fact, you appear to be almost a linguist. In how many languages have you attained proficiency, and how? Any comments on this rather strange blend of being an exceptionally brilliant scientist and a linguist? KHAN: I know a few languages. First of all, Urdu is my mother tongue. Then after the Partition I had to learn Hindi, which I still can read and write. Later on I learned some Persian. When I went to Europe, I learned German and Dutch. I know both languages quite well. While in Europe I also took some lessons in French. And of course English has been my second language all these years. I wish I could learn Russian and Chinese, but I couldn't find the time. REPORTER: Do you have any hobbies, and how do you relax after a strenuous day? KHAN: I used to go fishing, fly kites, and play hockey in my young days. Then I played volleyball at university. Now it is so difficult to do these things. I do some walking, and play with our dogs and cats. It is very relaxing. I also read quite a bit. We go to bed very late, usually after midnight, as my

wife is also always doing something, knitting, reading, etc. REPORTER: Thank you, Dr. A. Q. Khan.

On two days in May of 1998 India broke a twenty-four-year hiatus and tested five atomic bombs—the largest of which was claimed to be a thermonuclear (fusion) device with a temporarily dialed-down yield of forty-three kilotons, roughly three times that of Little Boy, which took out Hiroshima. Independent analysts expressed skepticism about the stated size and nature of the explosions, but these were technical quibbles of little importance compared with the new political reality of an India that wanted to make such a show of its earth-shattering might. Just a few weeks earlier Khan's laboratory had successfully fired its new intermediate-range missile (a North Korean derivative dubbed the Ghauri) on a maiden 500-mile flight, and Khan had followed up with his typical saber-rattling and bluster. Flown to its full 1,000-mile range, his missile, carrying his bomb, could devastate Mumbai, Delhi, and a slew of other Indian cities, including Bhopal (perhaps occasioning bittersweet satisfaction). The missile's flight, however, does not seem to have played heavily into the Indians' decision to test—in part because of their tendency to view Khan as a bigmouth and a buffoon. In fact, physical preparations in India had been under way for a month, and the decision to proceed was made for domestic political reasons by the insecure leaders of the governing Hindu Nationalist Party, the BJP, who wanted to impress the masses with their strength. Sure enough, after the tests there was widespread jubilation on the streets. The celebrants ignored the possibility that the next time a nuclear weapon was ignited in India, it might be dropping in from Pakistan and vaporizing them.

In Pakistan the Indian tests were seen as a direct threat. Special attention was paid to an overexcited Indian home minister named L. K. Advani, who declared that Islamabad would have to submit to this reality, particularly as it affected the dispute over Kashmir, and that Indian troops would henceforth chase Kashmiri insurgents in "hot pursuit" right back across the border into Pakistan. So much for the sobering effect of atomic bombs. As part of the package, the Indian press was full of taunts, challenging the Pakistanis to show, if they could, that their nuclear arsenal was anything more than a bluff. Either way the Indians figured to gain: if the Pakistanis did not now test a nuclear device, they would demonstrate their weakness, with delicious consequences for the local balance of power; if they did test, and successfully, they would join India as a target of international sanctions, and would suffer disproportionately because of their greater dependence on the charity of the world. The Pakistanis knew they were in a bind. They had weapons ready to go, and had prepared a test site years before by boring a horizontal tunnel into the center of a desert mountain, in a remote district called Chagai, in the southwestern province of Baluchistan. However, they were getting clear warnings that if they answered India in kind, they would lose not merely direct American aid, which had slowly been increasing since the last cutoff, but also the large infusions of cash from other donor nations and international lending organizations that were keeping Pakistan's economy alive. A rare public debate broke out among Pakistani elites, during which a "peace faction" urged the country's leaders to assume the moral high ground and let India take the heat alone. The soon-to-be-deposed prime minister, Nawaz Sharif, accepted repeated calls from Bill Clinton and Tony Blair, who urged the same. Sharif hoped for positive

inducements—solid security guarantees and financial payoffs—and some were promised. Public sentiment, however, was overwhelmingly in favor of a test, as was sentiment within the army—Pakistan's real center of power. After several weeks of hesitation the logic of the Subcontinent prevailed, and Sharif decided to proceed.

On the night of May 27, 1998, just hours before the scheduled test, word was received from Saudi intelligence that Israeli fighters, flying on behalf of India (of course), were inbound to take out Pakistan's nuclear facilities—specifically the laboratory at Kahuta and the test site in Chagai. Pakistan scrambled its own fighters and rolled its missiles out of their shelters in preparation to launch. Months later Khan gave an interview in which he was alleged to have said that at Kahuta that night nuclear weapons were loaded into the Ghauris—a statement he subsequently denied, and which for technical reasons seems dubious. In any case, the Indians responded immediately by preparing their own aircraft and missiles, and for a few hours the countries came close, perhaps, to a nuclear exchange. Had this occurred, it would have been just the sort of reflexive slaughter that people fear—particularly from countries like Pakistan, with insecure political and military institutions, primitive commandandcontrol systems, inadequate information sources, and ultra-short windows for response to their nuclear neighbors. But on the night of May 27, at least, the leaders of Pakistan had the sense to hesitate and pick up their phones. The United States and other nations assured them that they were safe, the Israeli attack never materialized, and May 28 dawned normally for the residents of the great cities on both sides of the border.

That afternoon a small group of Pakistanis associated with the weapons program, including, of course, A. Q. Khan, gathered in a concrete bunker in Chagai, facing the chosen mountain seven miles away. Pakistan later reported that five nuclear bombs had been placed inside the test tunnel where it hooked sharply, 800 feet beneath the mountain's peak. The bombs were fission devices, based on either the Kahuta or the PAEC's design, or both, and containing highly enriched uranium—though a remote possibility exists that a plutonium device was among those tested. The details remain secret. One bomb was said to be large, and four to be small. They were wired to detonate simultaneously—a practical arrangement that has led, however, to endless disputes about how many were actually involved. The official number of five was intended to match India's test exactly—with the special surprise of a sixth bomb tested elsewhere two days later, to one-up the score. The tunnel was sealed with heavy concrete plugs. At 3:15 P.M. a PAEC technician directly under Samar Mubarakmand, the leader of the test site, pushed the button, saying "*Allah-o-Akbar!*"—"God is great." After a delay of thirty-five seconds (during which, it is said, some observers prayed) the mountain heaved, shrouding itself in dust. The command post rocked. When the dust settled, the mountain's color had turned to white. In announcing the news Pakistan claimed a total yield that roughly equaled India's, of course, because if it was to be a response in kind, the numbers had to match. Independent analysts downgraded the actual yield by a factor of three—but so what? As far away as Cairo people danced in the streets.

Khan posed for pictures with the mountain behind him. He looked more subdued than pleased. It should have been his moment, the apogee of his life, and an occasion for the

entire nation to praise his name. *Khan-o-Akbar*, people could have said; Islam has its bomb, and Pakistan is saved. Indeed, people did give him thanks, and over the next few years, by external appearance, he rose to new heights of glory and fame. But he was beginning to face serious troubles now—political forces that ultimately would lead to his arrest and disgrace—and a small but clear warning was being sent to him on that day. Control of the test had been pointedly awarded to the treacherous—no, traitorous—PAEC. Munir Ahmed Khan was seven years retired by then, but the institutional rivalry had not eased. Now this Samar Mubarakmand—a PAEC flunky, a carpetbagger, a twit—had been parachuted in to lead the site. It was Mubarakmand who had been given the honor of orchestrating the event. And Khan had been allowed to visit as a "courtesy."

This treatment continued after Khan flew back to Islamabad. There was no official delegation to greet him. That welcome was reserved for Mubarakmand, who arrived later, and was met by the prime minister and a cheering crowd of hundreds. Khan, in contrast, was met by a small group of friends from the Kahuta plant, who waited for him in the "VVIP lounge," and then drove with him to his house for tea with Henny. Khan looked haggard, perhaps because the near nuclear war had kept him up the night before, but more likely because of the frustrations of the day. Either way, he was not his normal irrepressible self. One of his companions at the tea recently told me that out of concern he had asked Khan what was going on, and that Khan had not responded. It was a shock, he said, because for once Khan had seemed uncertain.

But looking back now, seven years later, the answer can be known. In Pakistan people understand more than they will ever admit out loud. There are cultural understandings about what goes on, houses on the shores of Rawalpindi's drinking supply. Pakistan had its bomb, and it was a good thing, but the utility of Khan was almost over. He was a genuine patriot, much to be admired, but too strong for anyone's good anymore. If he had become a monster, as some said, then some in the government and the army were implicated too. Was he out of control? For the moment he just needed to be reined in, and reminded that he was just one among a number of important men. Khan's activities were if anything about to expand. But it was only 1998, and there was no thought yet that he would have to be destroyed.