

THE FIRST **ASSASSINATION** OF THE 21ST CENTURY

## A FORMER SPY'S EXCRUCIATING DEATH BY RADIATION POISONING MARKS THE BEGINNING OF **AN ERA OF HIGH-TECH HIT MEN** WHO CAN KILL FROM ANYWHERE

BY JAMES GEARY, WITH REPORTING FROM MOSCOW BY VICTOR AKUNOV PHOTOGRAPH BY JOHN B. CARNETT

## THREE KEY FACTS

Alexander Litvinenko's murderers used polonium-210, a radioactive toxin deadly in even tiny doses.

Inside the body, the alpha radiation emitted by polonium-210 kills every living cell it touches. Litvinenko died in 22 days.

Similarly dangerous nuclear and biological materials go missing every year in the former Soviet Union. Its arsenal included 44,000 tons of chemical weapon agents at the end of the Cold War. **IT BEGAN AS A STANDARD ADMISSION.** When he arrived in the critical-care unit at University College Hospital (UCH) in central London last November 17, the patient in Room 9 was weak but alert. For just over two weeks he had been suffering from severe dehydration and vomiting. Comforted by a clutch of family and friends, he struggled to beat back an illness that was remorselessly attacking all his major organs. Physicians methodically disqualified the usual suspects—no food poisoning, no gastrointestinal infection. Then the patient's white-blood cell count dropped to practically nothing and his hair began to fall out. He showed all the symptoms of acute radiation syndrome, but no radiation had been detected. "The Geiger-counter readings were negative," recalls Geoff Bellingan, the clinical director of the department of critical care at UCH. "There was no clarity on the diagnosis."

While the doctors struggled to identify his condition, the patient in Room 9—Alexander Litvinenko, a vocal opponent of Russian president Vladimir Putin and an ex-officer in Russia's Federal Security Service (FSB), the successor to the KGB—had already reached his own conclusions. He was sure that he had been poisoned, and that the Kremlin had ordered his assassination.

What started as an ordinary ER case quickly blossomed into something larger: British researchers began to worry that this lone case might signify a health threat to the rest of the country. Litvinenko accused the Kremlin of seeking not

#### **DEATH OF A DISSIDENT**

During the late 1990s, Alexander Litvinenko was assigned to the FSB's organized-crime unit. His job was to combat corruption in the aftermath of the country's chaotic transition to a free-market economy. But he became disillusioned with the security agency, and in 1998, he held a strange press conference at which he and several other disgruntled officers (some of whom wore ski masks to hide their identity) accused their bosses of seeking to line their own pockets and LITVINENKO OPENLY WORRIED THAT HIS LIFE WAS IN DANGER.

was brought up on Soviet law," Gusak told the BBC's *Newsnight* television program. "That provides for the death penalty for treason. I think if in Soviet times he had come back to the USSR, [Litvinenko] would have been sentenced to death." A new law, adopted by the Russian parliament last year, authorizes the elimination outside Russia of individuals the Kremlin accuses of terrorism or extremism. Litvinenko openly worried that his life was in danger. He was right. His death began on November 1,

2006, when he met FSB-agents-turnedbusinessmen Dmitry Kovtun, Andrei Lugovoi and, possibly, Vyacheslav still, doctors did not know what was killing him. "We tried to examine his bone marrow, but it was so flat we couldn't get a sample," Bellingan says. "Something had poisoned all his dividing cells, but it wasn't clear which of many possible agents was involved."

Geiger counters failed to pick up any telltale gamma radiation—the easiest kind to detect—and radioactive thallium poisoning, an early hypothesis, had already been ruled out. "Once gamma was eliminated," Bellingan says, "we were looking at all comers. But the list of possible agents was very, very long." Litvinenko's case The AWE confirmed the polonium diagnosis at about 6 p.m. on November 23, but the news took several hours to reach the hospital. Before it did, at 9:21 p.m., the patient's heart gave out. He never knew the name of his poison.

### INTERNAL DECAY

Nuclear physicists call polonium "the Terminator"—not because of its efficacy as a poison but because it's the final element created in the process known as slow neutron capture. As an element, polonium occurs naturally in the Earth's crust as a by-product of the decay of uranium-238, and it accounts for about 1 percent of the total annual dose humans get from normal background radiation. In appearance, it resembles a silvery-gray dust—that is, if you can get enough of the stuff





Radiation led investigators to this stadium, where Vyacheslav Sokolenko saw a game.



Litvinenko with a masked colleague from the FSB in 1998, accusing the Kremlin of corruption and murder

"settle accounts with undesirable persons." In 2000, after falling out with Putin, Litvinenko fled Russia for London, the destination of choice for Russia's restive dissidents and disaffected oligarchs, where he continued to antagonize his former colleagues.

Litvinenko claimed in a book, for instance, that the FSB was responsible for a series of apartment bombings in Russia in 1999. (The attacks were officially blamed on Chechen separatists, and Putin had used the incident to help justify a fresh invasion of Chechnya in that same year.) He investigated the 2006 murder of journalist and Putin critic Anna Politkovskaya. In February of this year, Alexander Gusak, Litvinenko's old commanding officer at the FSB, accused him of having revealed to British authorities the identities of Russian agents. "I



Investigators at the German home of Dmitry Kovtun, who met with Litvinenko around the time he was poisoned

Sokolenko for tea at London's Millennium Hotel. Later that night, he complained of vomiting, diarrhea and fatigue. He checked into Barnet General Hospital in north London on November 3, but doctors couldn't find anything wrong. After exhausting the possibilities, and with Litvinenko's condition deteriorating, they transferred him to UCH on November 17.

Litvinenko's condition became progressively worse. Pictures of the former spy in his hospital bed show him looking paler than the crisp white walls in the UCH critical-care unit. On November 22, he was intubated and placed on mechanical ventilation. One by one, his vital organs—liver, kidneys, spleen—began to fail. His immune system collapsed as his whiteblood-cell count plummeted. And



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radio- Litvinenko in 2002, vidence after relocatany ing to London

had distinguished itself as something new, something more complicated than the British medical establishment could handle. To pinpoint the poison, a sample of Litvinenko's urine went to Britain's Atomic Weapons Establishment (AWE). Researchers there detected signs of alpha radiation.

One of the strongest emitters of alpha radiation is an isotope called polonium-210, generally manufactured for industrial use in anti-static devices. The isotope quickly became the focus of the AWE investigation, but it was too late to do the patient any good. Back at UCH, Litvinenko was fading fast. "His heart was getting weaker and weaker," says Jim Down, the intensive-care consultant on duty the day Litvinenko died. "His blood pressure dropped inexorably to nothing."



After an autopsy—conducted in hazmat suits—the body was interred in Highgate Cemetery, London.

together to actually be able to see it. (Litvinenko received an amount that would have fit on the head of a pin with room to spare.) Polonium-210, created by bombarding bismuth-209 with neutrons inside a nuclear reactor, is hard to find in high concentrations. Only about 100 grams are produced every year, most of it in Russia.

Unlike many other radioactive substances, polonium-210 is harmless as long as it remains outside the body. Once inside the body, though, the alpha radiation emitted by the isotope is about 20 times as damaging to cells as the gamma radiation emitted by elements like thallium.

Gamma rays can penetrate steel, concrete, human tissue. Alpha particles can't penetrate even a single sheet of Paper, or your epidermis. But when you



Litvinenko's Ex-FSB agent Ko widow, Marina, at the funeral service victim in London.





Andrei Lugovoi was also at the London meeting. Sokolenko may have been the third participant.



The restaurant, still quarantined, where Litvinenko ate just before collapsing



London's University College Hospital, where he died of radiation poisoning

### THE FUTURE OF ASSASSINATION





waiting for a bus near London's Waterloo Bridge when a man jabbed him with an umbrella and disappeared in

a taxi. Within days, Markov was dead. Doctors discovered a tiny metal pellet lodged in the dead man's thigh. The pellet, injected through the tip of the umbrella, contained the poison ricin.

During the free-market 1990s, businessmen were targeted. IVAN



KIVELIDI, a Moscow entrepreneur, died mysteriously in 1995. Police later found poison, allegedly from a chemical weapon, dusted over his phone receiver.

Since Putin came to power in 2000, dissidents have reentered the line of fire. In 2003, YURI SHCHEKOCHIKHIN, a journalist and parliament member



weeks later, he was dead. "His skin started to come off." recalls Alexander Gurov, a fellow parliamentarian and a friend of Shchekochikhin. Poisoning was suspected but never proved—Russian authorities sealed his medical records.

In September 2004, journalist ANNA POLITKOVSKAYA, a fierce Putin critic (and acquaintance of Litvinenko), boarded a flight to Beslan, where she hoped to help persuade Chechen



school. After drinking a cup of tea on the flight, she fell unconscious. She recovered, only to be shot to death in the elevator of her Moscow apartment building two years later.

swallow an alpha emitter-or inhale it, or it enters the bloodstream through an open wound—all molecular hell breaks loose. "It's like firing a missile at a bag of ping-pong balls," says Paddy Regan, a lecturer in nuclear physics at the University of Surrey outside London. "If you coat the inside of a person's gut with alpha particles, the particles will kill every cell they come into contact with."

Police suspect that Litvinenko was poisoned at the Millennium Hotel on November 1 and that the polonium, most likely dissolved in some kind of tasteless liquid solution, was slipped into his tea before or during his meeting with the Russian businessmen. The polonium-210 lined Litvinenko's gastrointestinal tract. From there, it seeped into his bloodstream and spread throughout his body, first targeting rapidly dividing cells-hair, skin, stomach, bone marrow. He probably received a much larger dose than was strictly needed to kill him, somewhere between one and 10 gigabecquerels. (A becquerel is a measure of radioactivity amounting to one alpha-particle emission per second. Ten gigabecquerels, the maximum suspected dose, would have delivered 10 billion alpha emissions per second.) The amount was so great, he had no hope of survival. Litvinenko is the first person known to have died of polonium-210 exposure, and the first murdered with it.

The businessmen from the Millennium meeting deny any involvement in his death, although traces of radiation were found along the paths they took in the days prior to the meeting. The trail of alpha radiation across London suggests that whoever poisoned Litvinenko did so at great personal risk. Inhaling it by accident, for instance, would have meant certain death.

Sites within the hotel, as well as several items of tableware, showed extremely high levels of polonium-210. The door to the men's room was so contaminated that public-health officials removed it and disposed of it as nuclear waste. Litvinenko's home and office were tainted by polonium-210, as were seats in airplanes, taxis and parts of a soccer stadium. You still can't book certain hotel rooms in London because they're buzzing with traces of polonium-210. "We're not dealing with scientists here who would have realized the hazards of the material," says one source familiar with the investigation.

If the purpose of the assassination was to send a warning to other dissidents, the assassins chose their weapon wisely: Polonium-210 creates all the terror of a nuclear strike without the risk of massive fatalities. Since polonium-210 was first identified in the case on November 23, the British Health Protection Agency has monitored about 40 sites; at least 20 of them had significant levels of polonium-210 contamination. The health agency has also tested the urine of about 700 people, earning it the nickname "the piss palace" among the staff. To date, 17 individuals have shown elevated levels of polonium-210.

Despite widespread fear of contamination, there was never any threat to the general public. "Polonium is useless as a weapon of mass destruction," Regan says. If it had been poured into London's water supply instead of Litvinenko's tea, for example, it would have dispersed so quickly that no one would have received a dangerous dose.

And although they may not have understood the risks they were taking, whoever masterminded the killing had clearly researched their weapon to some extent. Nick Priest, a professor of radiobiology at Middlesex University in England, estimates that it would have taken a few days in a reactor to produce the amount of polonium-210 delivered to Litvinenko. Polonium-210 has a half-life of 138 days, meaning half of it will decay in about four and a half months. So the assassins must have planned the operation well in advance and then acted promptly. Also,

WHOEVER POISONED HIM DID SO AT GREAT PERSONAL RISK.

# **HOW POLONIUM-210 KILLED LITVINENKO**

The ex-spy's final days were an agonizing process of cellular damage throughout the body

**KIDNEY** By simultaneously passing polonium-210 to the bloodstream and the bladder, the kidneys distributed radiation before failing themselves.

HAIR AND SKIN Once the ingested polonium-210 entered Litvinenko's bloodstream, it first affected rapidly dividing cells, like those in skin, by bombarding them with alpha particles. Hair follicles in particular tend to absorb the radiation extremely readily. Litvinenko suffered hair loss, itching and painful breakdown of the epidermis.





est and most important contributing factor in a radiation victim's death, irradiated bone-marrow failure is compounded by organ failure elsewhere in the body. Damaged stem cells die off, driving down blood-cell counts and leading to infection and hemorrhaging.



**INTESTINES** The mucosal lining of the intestines is made up of protruding villi, which absorb nutrients. Some villi are sloughed off during normal digestion, and these cells are replaced. Radiation damages the villi's regenerative abilities, and digestion begins to painfully wear away the intestinal wall.

LIVER The irradiated liver

also helped spread deadly

particles. In bile, it passed

them on to the intestines.



#### THE FUTURE OF ASSASSINATION

the choice of polonium itself suggests a certain sophistication. "They knew they could move it across borders because there is no gamma radiation." Priest says. "They knew that it would be taken up by gut. And they knew it was obscure. Even when doctors knew it was radiation [that was killing Litvinenkol, they still didn't think of polonium." Now, of course, scientists and police think of little else.

Why, given all the methods available, did Litvinenko's killers choose polonium, rather than a knife across the throat, or a bullet to the head? "I think they supposed Litvinenko would die quickly," says Vladimir Ryzhkov, an independent member of the Russian parliament, "and that specialists wouldn't find out what substance was used. Polonium decays rapidly, so they may have expected no traces would be left behind and the British would say the cause of death was unknown."

In Russian political life, assassins who wish to remain anonymous often hide behind obscure methods [see "101



makes the former USSR a prime source of nuclear- and chemical-weapon materials.

DISMANTLED Uneven control of its arsenal

MAKE ROOM FOR THE THREAT OF TARGETED NUCLEAR TERRORISM.

Ways to Die," page 80]. "You only need exotic ways of killing people when you don't want the truth to be revealed," says Alexei Kondaurov, a former KGB general who is now a parliamentarian critical of Putin's government. "But science has come a long way, and with modern methods of analysis, it's almost impossible to hide the truth."

Concern about contamination delayed Litvinenko's autopsy for a week, as officials discussed the precautions that had to be taken in cutting the dead man open. When the postmortem finally did take place, ventilation in the operating theater was switched off to prevent any wayward polonium-210 becoming airborne, according to someone familiar with the procedure. Everyone stripped to their underwear before donning two separate impervious plastic suits, as well as a cylindrical

shawl and helmet combination that slipped over their heads and shoulders like a beekeeper's outfit. Filtration units slung on their belts pumped scrubbed air into the suits. Tissue samples were passed through an airlock to a waiting pathologist, while a radiation-protection official continually monitored the room for alpha particles.

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#### WET WORK

The former Soviet Union has always been one of the world's premiere think tanks for exotic assassination methods. In the 1930s, Stalin established a secret branch of the KGB with the fearsome name "The Administration for Special Tasks." The Administration had a medical section called Kamera solely devoted to the development of exotic poisons and toxins. The "special tasks" (CONTINUED ON PAGE 98)

## **TROUBLE IS BREWING**

Litvinenko was killed by a speck of radioactive material. Whole warheads' worth are stolen in Russia every year

OF THE ROUGHLY 250 THEFTS reported to the International Atomic Energy Agency's Illicit Trafficking Database since 2004 (and those are only the reported thefts), 14 involved polonium-210. Dozens of anecdotes like the following show that dangerous materials in Russia are readily available to the brazen and the enterprising.

2006	2005	2004	2003
Russian citizen	Moscow's internal	The security chief	Russian courts try
Oleg Khintsa-	security com-	at Russia's larg-	a man for offer-
gov and three	mander estimates	est facility for	ing \$750,000 for
accomplices are	that only seven	processing pluto-	weapons-grade
arrested attempt-	of its critical	nium and highly	plutonium.
ing to sell 100	nuclear facilities	enriched uranium	An Armenian
grams of highly	have adequate	warns that its	with 170 grams
enriched uranium	security, while	guards regularly	of stolen HEU is
(HEU)—more than	39 had "serious	fail tests of their	arrested at the
enough to build a	shortcomings."	ability to protect	Georgian border.
functional nuclear	Russia's	nuclear material	Two teenag-
weapon—to	nuclear agency	against attack and	ers reportedly die
undercover	says its budget is	theft, frequently	of poisoning after
security agents	a third of what's	patrol without	stealing materials
in the Republic of	needed to secure	ammunition, and	from a Chechen
Georgia.	nuclear facilities.	are often corrupt.	nuclear facility.

Sources: Matthew Bunn, Kennedy School of Government, Harvard University; Nuclear Threat Initiative; International Atomic Energy Agency

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# THE FIRST ASSASSINATION OF THE 21ST CENTURY

this group administered consisted of what was known in the espionage jargon of the day as wet work: abducting and/or assassinating perceived "enemies of the people," wherever in the world they might be. One KGB memo stated, "As these traitors . . . have been sentenced to death in their absence, this sentence will be carried out abroad."

Radiation soon entered the arsenal for high-priority assassinations. In 1957, for instance, Nikolai Khokhlov—like Litvinenko, a former-agent-turnedcritic who fled Russia to live in the West-took part in an anti-Soviet conference in Frankfurt, Germany. Shortly after sipping a cup of coffee that somebody handed him, he felt ill and fainted. Food poisoning was initially suspected, until strange lesions began appearing on Khokhlov's face and his hair started coming out in clumps. Doctors at an American military hospital eventually identified radioactive thallium and managed to save his life. Khokhlov felt confident that the Kremlin was behind the hit.

Now some regard last year's legislation authorizing killings outside Russia-and a rash of recent assassinations-as a bit too reminiscent of the bad old days. "This is not a retreat to Soviet times," Kondaurov says, "but to one period of it, around 1937. [These killings show that] we're arriving at some violent authoritarian regime, a new quality of the Russian authorities that's similar to the worst examples of the past."

Kremlin officials have strenuously denied any involvement in Litvinenko's murder. And just because the polonium probably came from a Russian reactor doesn't mean that the assassination was officially sanctioned. "Reactors are making grams and grams of the (CONTINUED ON PAGE 100)

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# THE FUTURE OF ASSASSINATION

CONTINUED FROM PAGE 100)

# THE FIRST ASSASSINATION OF THE 21ST CENTURY

had an estimated 44,000 tons of chemical agents (including plague, tularemia, anthrax and smallpox) at the end of the Cold War. Just 20 percent are due to be eliminated by the end of this year. "The concern is that [these materials] might be susceptible to rogue elements who

at vulnerable borders and transport hubs. And even extra measures like these won't always be successful. In January, news emerged that 100 grams of highly enriched uranium had been seized last February in Tbilisi, the capital of Georgia. The smuggler tried

# THESE THREATS ARE NOW PART OF THE LANDSCAPE.

could use them in pursuit of financial or other interests," Antonenko says.

It's hard to see what security services can do to stop traffic in substances that are dangerous even in microscopic doses, apart from installing ever more sophisticated detection technology and carrying out ever more invasive searches to sell the material to an undercover police officer posing as a representative of a terrorist organization.

At the moment, of course, former Russian spies and current Russian dissidents—not everyday citizens—are the most likely targets for exotic assassinations using polonium or other unconventional weapons. But these threats are now part of the landscape, and someone will always be prepared to spend the time and money necessary to use them. Litvinenko's murder is more than just a bizarre true-crime thriller. It's the first assassination of the 21st century, the first strike in a new world of high-tech murder.

Walter Litvinenko was in the room when his son passed away. "My son died," he said later, "and he was killed by a little nuclear bomb." The aftershocks from that explosion are still rippling through the world's security and intelligence communities. And perhaps that's just what the assassins intended. Maybe they wanted to send a message: This is a new and horrible way to die, and, in the end, no one is safe from us.

James Geary is the former Europe editor for Time magazine. He is the author of The Body Electric: An Anatomy of the New Bionic Senses and The World in a Phrase: A Brief History of the Aphorism.

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