



NUKE KID ON THE BLOCK

David Hahn was an ordinary American teenager who went to extraordinary lengths to obtain his boy scout badge – he built a nuclear reactor in his back yard. *By Ken Silverstein*

There is hardly a boy or a girl alive who is not keenly interested in finding out about things. And that's exactly what chemistry is: FINDING OUTABOUT THINGS—finding out what things are made of and what changes they undergo. What things? Every thing! (The Golden Book of Chemistry Experiments)

Golf Manor is the kind of place where nothing unusual is supposed to happen, the kind of place where people live precisely because it is more than 25 miles outside Detroit and all the complications attendant on that city. The kind of place where money buys a bit more land, perhaps a second bathroom, and so reassures residents that they're safely in the bosom of the middle class. Every element of Golf Manor invokes one form of security or another, beginning with the name of the suburb itself - taken from the 18-hole course at its entrance — and the community in which it is nestled, Commerce Township. The houses and trees are both old and varied enough to make Golf Manor neighborhood than a suburb, and the few features that do convey suburbia- a sign at the entrance saying, "We have many children but none to spare. Please drive carefully" — have a certain Back to the Future charm. Most Golf Manor residents remain there until they die, and then they are replaced by young couples with kids. In short, it is the kind of place where on a typical day, the only thing lurking around the corner is a Mister Softee ice cream van.

But June 26, 1995, was not a typical day. Ask Dottie Pease. As she turned down Pinto Drive, Pease saw 11 men swarming across her carefully manicured lawn. Their attention seemed to be focused on a large wooden potting shed that abutted the chain-link fence dividing her property from her neighbor's. Three of the men had donned ventilated moon suits and were proceeding to dismantle the potting shed with electric saws, stuffing feel

more like a the pieces of wood into large steel drums emblazoned with radioactive warning signs. Pease had never noticed anything out of the ordinary at the house next door.

A middle-aged couples Michael Polasek and Patty Hahn, lived there. On some weekends, they were joined by Patty's teenage son, David. As she huddled with a group of nervous neighbors, though, Pease heard one resident claim to have awoken late one night to see the potting shed emitting an eerie glow. "I was pretty disturbed," Pease recalls. "I called my husband. I said, Da-a-ve, there are men in funny suits walking around off out here. You've got to do something."

What the men in the funny suits found was that the potting shed was dangerously irradiated and that the area's 40,000 residents could be at risk. Publicly, the met in white promised the residents of Golf Manor that they had nothing to fear, and to this day neither Pease nor any of the dozen or so people I interviewed knows the real reason that the Environmental Protection Agency (EPA) invaded their neighborhood. When asked, most mumble something about a chemical spill. The truth is far more bizarre: the Golf Manor cleanup was provoked by the boy next door, David Hahn, who tried to build a nuclear breeder reactor in his mother's potting shed as part of a boy scout merit-badge project.

It seems remarkable that David's story hasn't become the stuff of legends but at the time the FPA refused to give out David's name, and although a few local reporters learnt it, neither he nor any family members agreed to be interviewed. Even the federal and state officials who oversaw the cleanup learned only a small part of what took place. Then, in 1996, Jay Gourley, a correspondent with the Natural Resources News Service in Washington, DC, came across a tiny newspaper item about the case and contacted David Hahn. Gourley later passed on his research to me, and I subsequently interviewed the story's protagonists, including David — now a 22-year-old sailor stationed in Norfolk, Virginia.

I met David in the hope of making sense not only of his experiments but of him. The archetypal American suburban boy learns how to hit a fade-away jump shot, change a car's oil, perform minor carpentry feats. If he's a boy scout he masters the art of starting a fire by rubbing two sticks together, and if he's a typical adolescent pyro, he transforms tennis-ball cans into cannons. David Hahn taught himself to build a neutron gun. He figured out a way to dupe officials at the Nuclear Regulatory Commission into providing him with the crucial information he needed in his attempt to build a breeder reactor. then he obtained and purified radioactive elements such as radium and thorium.

I had seen childhood photographs of David in which he looked perfectly normal, even angelic, with blond hair and hazel-green eyes, and, as he grew older, gangly limbs and a peach-fuzz mustache. Still, when I went to meet him in Norfolk, I was anticipating some physical manifestation of brilliance or obsession. But all I saw was a beefier version of the clean-cut kid in the pictures. David's manner was oddly dispassionate, though polite, until we began to discuss his nuclear adventures. Then, for five hours, lighting and

grinding out cigarettes for emphasis, David enthused about laboring in his back yard laboratory. He told me how he used coffee filters and pickle jars to handle deadly substances such as radium and nitric acid, and he divulged the various cover stories and aliases he employed to obtain the radioactive materials. A shy and withdrawn teenager, David had confided in only a few friends about his project and never let anyone witness his experiments. His breeder reactor project was a means — albeit an unorthodox one — of escaping the trauma of adolescence.

In The Making of The Atomic Bomb, Richard Rhodes notes that the Psychological profiles of pioneering American physicists are remarkably similar. Frequently the eldest son of an emotionally remote, professional man, he - almost all were men - was a voracious reader during childhood, tended to feel lonely and was shy and aloof from Classmates. (The Golden Book of Chemistry Experiments)

David's parents, Ken and Patty Hahn divorced when he was a toddler. Ken is an automotive engineer for General Motors, as is his second wife, Kathy Missig. David lived with his father and stepmother in suburban Clinton Township, about 30 miles north of Detroit. Ken Hahn worked extraordinarily long hours. With close-cropped hair and a proclivity for short-sleeved dress shirts, Ken radiates a coolness that, combined with his constant preoccupation, must have been confounding to a child. Yet for all his starchiness, it was Kathy who was David's chief disciplinarian.

David spent weekends and holidays with his mother and her boyfriend, Michael Polasek, an amiable but hard-drinking retired fork-lift operator. Golf Manor is demographically similar to Clinton Township, but the two households could not have been more different emotionally. Patty Hahn committed suicide in the house in 1996, but Michael still lives there surrounded by pictures of her. He keeps five cats and a spotless household, and looks like a member of the retro rock Sha Na Na.

Despite the fact that David was shuffled between households, his early years were seemingly ordinary. He played baseball and soccer, and joined the boy scouts. An abrupt change came at the age of 10, when Kathy's father, also an engineer for GM, gave David The Golden Book of Chemistry Experiments. The book promised to open doors to a brave new world and offered instructions on how to set up a home laboratory. David swiftly became immersed and by the age of 12 was digesting his father's college chemistry textbooks without difficulty. When he spent the night at Golf Manor, his mother would often wake to find him asleep on the living-room floor surrounded by open volumes of the Encyclopedia Britannica.

In his father's house, David set up a laboratory in his small bedroom. He bought beakers, Bunsen burners, test tubes, and other items that are commonly found in a child's chemistry set. David, though, was not conducting typical adolescent experiments. By 14, he had fabricated nitroglycerine.

David's parents admired his interest in science but were alarmed by the spills and blasts that became a regular event at the Hahn household. After David destroyed his bedroom, the walls were pocked, and the carpet was so stained that it had to be ripped out — Ken and Kathy banished his experiments to the basement.

Which was fine with David. Science allowed him to escape into something he was a success at, while sublimating a teenager's sense of failure, anger and embarrassment into some really big explosions. David held a series of after-school jobs at fast-food joints, grocery stores and furniture warehouses, but work was merely a means of financing his experiments. Never an enthusiastic student and always a horrific speller, David fell behind in school. During his junior year at Chippewa Valley High School—at a time when he was secretly conducting nuclear experiments in his back yard—he nearly failed state math and reading tests required for graduation (though he aced the test in science). His scientific preoccupation left less and less time for friends, though throughout much of high school he did have a girlfriend, Heather Beaudette, three years his junior. Heather says he was sweet and caring but not always the perfect date. Heather's mom, Donna Beaudette, puts it this way: "He was a nice kid and always presentable, but [in the days before her second wedding] we had to tell him not to talk to anybody. He could eat and drink but, for God's sake, don't talk to the guests about the food's chemical composition."

Not even his scout troop was spared David's scientific enthusiasm. He once appeared at a scout meeting with a bright orange face caused by an overdose of canthaxanthin, which he was taking to test methods of artificial tanning. One summer, he was expelled from scout camp when he stole a number of smoke detectors to disassemble for parts he required for his experiments.

Up to this point the most illicit of David's concoctions were fireworks and moonshine. But, convinced that David's experiments and erratic behavior were signs that he was making and selling drugs, Ken and Kathy began to spot-check the public library, where David told them he studied. Invariably he would be there as promised, surrounded by a huge pile of chemistry books. But Ken and Kathy were not assuaged, and, worried that he would level their home, they prohibited David from being there alone. Kathy began routinely searching David's room and disposing of any chemicals and equipment she found hidden under the bed and deep within the closet. David was not deterred. One night, as Ken and Kathy were sitting in the living room watching TV, the house was rocked by an explosion in the basement. There they found David lying semiconscious on the floor, his eyebrows smoking. Unaware that red phosphorus is pyrophoric, David had been pounding it with a screwdriver and ignited it. He was rushed to hospital to have his eyes flushed, and even months later had to make regular trips to an ophthalmologist to have pieces of the plastic phosphorus container plucked from his eyes.

Kathy then forbade David from experimenting in her home. So he shifted his base of operations to his mother's potting shed in Golf Manor. Both Patty Hahn and Michael Polasek admired David for the endless hours he spent in his new lab, but neither of them had any idea what he was up to.

Few people whom David confided in understood what he was doing. Ken Hahn, who had taken chemistry courses in college, could follow some of what David told him but thought he was exaggerating for attention. "I never saw him turn green or glow in the dark," he says. "I was probably too easy on him."

It probably didn't feel that way to David. Although Ken is immensely proud of David's experiments now that they have a certain notoriety, at the time they represented a breakdown in discipline. As fathers are wont to do, Ken felt the solution lay in a goal that he didn't himself achieve as a child — Eagle scout. As teenagers are wont to do, David subverted that goal.

In addition to showing "scout spirit," Eagle Scouts must earn 21 merit badges. Eleven are mandatory, such as first aid and citizenship in the community. The final 10 are optional; scouts can choose from dozens of choices, ranging from American business to woodwork. David elected to earn a merit badge in atomic energy. His scoutmaster, Joe Auito, says he's the only boy to have done so in the history of Clinton Township Troop 371. David's atomic-energy merit-badge pamphlet was brazenly pro-nuclear, which is no surprise since it was prepared with the help of Westinghouse Electric, the American Nuclear Society, and the Edison Electric Institute, a trade group of utility companies, some of which run nuclear power plants.

David was awarded his atomic-energy merit badge on May 10, 1991, five months shy of his 15th birthday. To earn it he made a drawing showing how nuclear fission occurs, visited a hospital radiology unit to learn about the medical uses of radioisotopes (radioactive elements that disintegrate and emit other particles and energy), and built a model reactor using a juice can, coat hangers, soda straws, kitchen matches and rubber bands. By now, though, he had far grander ambitions. As Auito's wife and troop treasurer, Barbara, recalls, "The typical kid [working on the merit badge] would have gone to a doctor's office and asked about the x-ray machine. Dave had to go out and try to build a reactor."

What is a breeder reactor? This simplistic description comes from a publication that David obtained from the Department of Energy (DOE): "Imagine you have a car and begin a long drive. When you start, you have half a tank of gas. When you return home, instead of being nearly empty, your gas tank is full. A breeder reactor is like this magic car. A breeder reactor not only generates electricity, but it also produces new fuel."

All reactors, conventional and breeder, rely on a critical pile of a naturally radioactive element — typically uranium-235 or plutonium-239 — as the "fuel" for a sustained chain of reactions known as fission. The nuclear industry used to tout breeders as the magical solution to the nation's energy needs. The government had opened up two experimental breeders at a test site in Idaho by 1961. Amid great fanfare in 1963, Detroit Edison opened the Enrico Fermi power plant, the nation's first and only commercially run breeder reactor. The following decade, Congress appropriated billions of dollars for the Clinch River Breeder Reactor in Tennessee. Hopes ran so high that Glenn Seaborg, chairman of

the Atomic Energy Commission during the Nixon years, predicted that breeders would be the backbone of an emerging nuclear economy and that plutonium might be a logical contender to replace gold as the standard of our monetary system.”

Such optimism proved to be unwarranted. The first Idaho breeder had to be shut down after suffering a partial core meltdown; the second breeder generated electricity but no new fuel. The Fermi plant — located just 60 miles from Clinton Township — was plagued by mechanical problems, accidents and budget overruns. In 1966, the plant's core suffered a partial meltdown after the cooling system malfunctioned; six years later it was shut down permanently.

If he knew of such setbacks David was not deterred. His inspiration came from the nuclear pioneers of the late 19th and early 20th centuries: Antoine Henri Becquerel, the French physicist who, along with Pierre and Marie Curie, received the Nobel prize in chemistry in 1903 for discovering radioactivity; Frederic and Irene Joliet-Curie, who received the Nobel prize for chemistry in 1935 for producing the first artificial radioisotope; Sir James Chadwick, who won the Nobel prize in physics the same year for discovering the neutron; and Enrico Fermi, who created the world's first sustainable nuclear chain reaction, a crucial step leading to the production of atomic energy and atomic bombs. Unlike his predecessors, however, David did not have vast financial support from the state, no laboratory save for a musty potting shed, no proper instruments or safety devices, and, by far his chief impediment, no legal means of obtaining radioactive materials. To get round this last obstacle, David utilized a number of cover stories and concocted identities, plus a Geiger counter kit he ordered from a mail-order house in Scottsdale, Arizona, which he assembled and mounted to the dashboard of his burgundy Pontiac 6000.

David hadn't hit on the idea to try to build a breeder reactor when he began his nuclear experiments at the age of 15, but, in a step down that path, he was already determined to "irradiate anything" he could. To do that he tried to build a "gun" that could bombard isotopes with neutrons. He wrote to a number of groups listed in his merit badge pamphlet — the DOE, the Nuclear Regulatory Commission (NRC), the American Nuclear Society, the Edison Electric Institute, and the Atomic Industrial Forum, the nuclear-power industry's trade group — in the hope of discovering how he might obtain, from both natural and commercial sources, the radioactive raw materials he needed to build his neutron gun. By writing up to 20 letters a day and claiming to be a physics instructor at Chippewa Valley High School, David says that he obtained "tons" of information from these groups, though none proved to be more helpful than the NRC. The agency's director of isotope production and distribution offered him tips on isolating certain radioactive elements, and imparted a piece of information that would prove to be vital to his plans: "Nothing produces neutrons as well as beryllium. "When David asked about the risks posed by such materials, the official assured "Professor Hahn" that the "real dangers are very slight, "since possession" of any radioactive materials in quantities and forms sufficient to pose any hazard is subject to Nuclear Regulatory Commission (or equivalent) licensing."

The newspapers have published numerous diagrams, not fiery helpful to the average man, of protons and neutrons doing their stuff... But curiously tide has been said about the question that is of most urgent interest to all of us, namely, "How difficult Are these things to manufacture?" (George Orwell, You and the Atom Bomb, 1945)

Armed with information from his friends in government and industry David typed up a list of sources for 14 radioactive isotopes. Americium-241, he learnt from the boy scout atomic-energy pamphlet, could be found in smoke detectors; radium-226 in antique luminous dial clocks; uranium-238 and uranium-235 in a black ore called pitchblende; and thorium-232 in gas lanterns.

To obtain americium-241, David contacted smoke detector companies and claimed that he needed a large number of the devices for a school project. One company agreed to sell him about 100 broken detectors for a dollar apiece. David wasn't sure where the americium-241 was located, so he wrote to BRK Electronics in Aurora, Illinois. A customer-service representative named Beth Weber wrote back to say she'd be happy to help out. She explained that each detector contains only a tiny amount of americium-241, which is sealed in a gold matrix. Thanks to Weber's tip, David extracted the americium components and then welded them together with a blowtorch.

Soon, his neutron gun, crude but effective, was made and he was ready to irradiate. He could have concentrated on transforming previously non-radioactive elements, but in a decision that was both indicative of his personality and instrumental to his later attempt to build a breeder reactor, he wanted to use the gun on radioisotopes to increase the chances of making them fissionable. He thought that uranium-235, which is used in atomic weapons, would provide the "biggest reaction." He wrote to a Czechoslovakian firm that sells uranium to commercial and university buyers. Claiming to be a professor buying materials for a nuclear research laboratory, he obtained a few samples of a black ore — either pitchblende or uranium dioxide, both of which contain small amounts of uranium-235 and uranium-238. However, he miscalculated uranium's solubility, and subsequently turned his attention to thorium-232, an element that has a very high melting point. Aided by his merit-badge pamphlet and his father's chemistry books, he found a way to purify thorium to at least 9000 times the level found in nature and 170 times the level that requires NRC licensing.

Next, David began preparing radium for an improved irradiating gun and began visiting junk yards and antiques stores in search of radium-coated dashboard panels or clocks. Once he found such an item, he'd chip paint from the instruments and collect it in pill vials. It was slow going until, one day, driving through Clinton Township to visit his girlfriend, Heather, he noticed that his Geiger counter went wild as he passed Gloria's Resale Boutique/Antique. The proprietor, Gloria Genette, still recalls the day when she was called at home by a store employee who said that a polite young man was anxious to buy an old table clock with a tinted green dial but wondered if she'd come down in price. She would. David bought the clock for \$10. Inside he found a vial of radium paint left

behind by a worker either accidentally or as a courtesy so that the clock's owner could touch up the dial when it began to fade.

To concentrate the radium, David secured a sample of barium sulfate from the Fray ward at a local hospital (staff there handed over the substance because they remembered him from his merit-badge project) and heated it until it liquefied. Whether David realized it or not, by handling purified radium he was truly himself in danger. Nevertheless, he proceeded to acquire another neutron emitter to replace the aluminum used in his previous neutron gun. His cute little americium gun was now a more powerful radium gun. David began to bombard his thorium and uranium powders in the hope of producing at least some fissionable atoms. He measured the results with his Geiger counter, but while the thorium seemed to grow more radioactive, the uranium remained a disappointment.

Once again, "Professor Hahn" sprang into action, writing to his old friend at the NRC to discuss the problem. The NRC had the answer. David's neutrons were too "fast" for the uranium.

He would have to slow them down using a filter of water, deuterium, or tritium. Water would have sufficed, but David liked a challenge. Consulting his list of commercially available radioactive sources, he discovered that tritium, a radioactive material used to boost the power of nuclear weapons, is found in glow-in the-dark gun and bow sights, which David promptly bought from sporting goods stores and mail-order catalogues. When he had enough, he smeared the substance over the beryllium strip and targeted the gun at uranium powder. He monitored the results with his Geiger counter over several weeks, and it appeared that the powder was growing more radioactive by the day.

Now 17, David hit on the idea of building a model breeder reactor. His blueprint was a schematic of a checkerboard breeder reactor he'd seen in one of his father's college textbooks. Ignoring any thought of safety, David took the highly radioactive radium and americium out of their respective lead casings to form makeshift "core" for his reactor.

He monitored his "breeder reactors" at the Golf Manor laboratory with his Geiger counter. "It was radioactive as heck," he says.

Finally, David, whose safety precautions had thus far consisted of wearing a makeshift lead poncho and throwing away his clothes and changing his shoes following a session in the potting shed, began to realize that, sustained reaction or not, he could be putting himself and others in danger. When his Geiger counter began picking up radiation five doors down from his mother's house, he decided he had "too much radioactive stuff in one place" and began to disassemble the reactor. He placed the thorium pellets a shoe box that he hid in his mother's house, left the radium and americium in the shed, and packed most of the rest of his equipment into the trunk of the Pontiac 6000.

WASTE DISPOSAL. If you can dump your waste directly into the kitchen drain (NOT into the sink), you are all right. If not, collect it in a plastic pail to be thrown out when you're finished. (The Golden Book of Chemistry Experiments)

At 2:40am on August 31, 1994, the Clinton Township police responded to a call concerning a young man who had been spotted in a residential neighborhood, apparently stealing tires from a car. When the police arrived, David told them he was waiting to meet a friend. Unconvinced, officers decided to search his car. When they opened the boot, they discovered a toolbox shut with a padlock and sealed with duct tape. The boot also contained over 50 foil-wrapped cubes of mysterious gray powder, small discs and cylindrical metal objects, lantern mantles, mercury switches, a clock face, ores, fireworks, vacuum tubes, and assorted chemicals and acids. The police were especially alarmed by the toolbox, which David warned them was radioactive and which they feared was an atomic bomb.

For reasons that are hard to fathom, Sergeant Joseph Mertes, one of the arresting officers, ordered the car, containing what he noted in Lois report to be "a potential improvised explosive device," to be towed to police headquarters. "It probably shouldn't have been done, but we thought the car had been used in the commission of a crime," Police Chief Al Ernst now says sheepishly.

The police called in the Michigan State Police Bomb Squad to examine the Pontiac, and the State Department of Public Health (DPH) to supply radiological assistance. The good news, the two teams discovered, was that David's toolbox was not an atomic bomb. The bad news was that David's trunk did contain radioactive materials, including concentrations of thorium — "not found in nature, at least not in Michigan" — and americium. That discovery automatically triggered the Federal Radiological Emergency Response Plan, and state officials soon were embroiled in tense phone consultations with the DOE, EPA, FBI and NRC.

With the police, David was largely uncooperative. He provided his father's address but didn't mention his mother's house or his potting-shed laboratory. It wasn't until Thanksgiving Day that Dave Minnaar, a DPH radiological expert, finally interviewed David. David told Minnaar that he had been trying to make thorium in a form he could use to produce energy and he hoped "his successes would help him earn his Eagle Scout status" David also admitted to having a back-yard laboratory.

On November 29, state radiological experts surveyed the potting shed. They found aluminum pie dishes, jars of acids, Pyrex cups, milk crates and other materials strewn about, much of it contaminated with what subsequent official reports would call "excessive levels" of radioactive material. But although Minnaar's troops didn't know it at the time, they conducted their survey long after David's mother, alerted by Ken and Kathy and petrified that the government would take her home away as a result of her son's experiments, had ransacked the shed and discarded most of what she found, including his neutron gun, the radium, pellets of thorium that were far more radioactive than what the

health officials found, and several quarts of radioactive powder. "The funny thing is," David now says, "they only got the garbage, and the garbage got all the good stuff."

After determining that no radioactive materials had leaked outside the shed, state authorities sealed it and petitioned the federal government for help. The NRC licenses nuclear plants and research facilities and deals with any nuclear accidents that take place at those sites. David's, of course, was not an NRC-licensed operation, so it was determined that the EPA, which responds to emergencies involving lost or abandoned atomic materials, should be contacted for assistance.

EPA officials arrived in Golf Manor on January 25, 1995, to conduct their own survey of the shed. Their "action memo" noted that conditions at the site "present an imminent and substantial endangerment to public health or welfare or the environment" and that there was "actual or potential exposure to nearby human populations, animals, or food chain." A cleanup took place between July 26 and 28, 1995 at a cost of about \$60,000. After the moon-suited workers dismantled the potting shed with electric saws, they loaded the remains into 39 sealed barrels placed aboard a semi-trailer bound for Envirocare, a dump facility located in the middle of the Great Salt Lake Desert. There, the remains of David's experiments were entombed along with tons of low-level radioactive debris from the government's atomic-bomb factories, plutonium production facilities and contaminated industrial sites. Last May, I made the 90-mile drive from Detroit to Lansing, where Dave Minnaar works in a state environmental agency. Because Patty Hahn had cleaned out the shed before Minnaar's men arrived on the scene, he never knew that David had built neutron guns or that he had obtained radium. Nor did he understand, until I told him, that the cubes of thorium powder found by the police were building blocks for a model breeder reactor. "These are conditions that regulatory agencies never envision," says Minnaar. "It's presumed that the average person wouldn't have the technology or materials required to experiment in these areas."

"The real danger... Yes in the radioactive properties of these elements. (Some) migrate to bone marrow, Mere their radiation interferes with the production of red blood cells. Less than one-millionth of a gram can be fatal." (From David's notes)

David went into a serious depression after the federal authorities shut down his laboratory. Years of painstaking work had been thrown in the garbage or buried. Students at Chippewa Valley had taken to calling him "Radioactive Boy," and when his girlfriend, Heather, sent him Valentine's Day balloons at his high school, they were seized by the principal, who feared they had been inflated with chemical gases that David needed to continue his experiments. In a final indignity, some area scout leaders attempted (and failed) to deny David his Eagle Scout status, saying that his extracurricular merit badge activities had endangered the community.

In autumn 1995, Ken and Kathy demanded that David enroll in Macomb Community College. He majored in metallurgy but skipped many of his classes and spent much of the day in bed or driving in circles around their block. Finally, Ken and Kathy gave him an

ultimatum: join the armed forces or move out of the house. They called the local recruiting office, which sent a representative to their house or called nearly every day until David finally gave in. After completing boot camp in 1997, he was stationed on the nuclear-powered USS Enterprise aircraft carrier.

Alas, David's duties, as a lowly seaman, are of the deck-swabbing and potato peeling variety. But long after his shipmates have gone to sleep, he stays up studying topics that interest him — currently steroids, melanin, genetic codes, antioxidants, prototype reactors, amino acids, and criminal law. And it is perhaps best that he does not work on the ship's eight reactors, for EPA scientists worry that his previous exposure to radioactivity may have greatly cut short his life. All the radioactive materials he experimented with can enter the body through ingestion, inhalation or skin contact and then deposit in the bones and organs, where they can cause a host of ailments, including cancer. Because it is so potent, the radium that David was exposed to in a small, enclosed place is most worrisome of all.

Back in 1995, the EPA arranged for David to undergo a full examination at the nearby Fermi nuclear power plant. David, fearful of what he might learn, refused. Now, though, he's looking ahead. "I wanted to make a scratch in life," he explains when I ask him about his early years of nuclear research. "I've still got time. I don't believe I took more than five years off of my life."