

The Man Who Made the Supergun

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ANNOUNCER: The 16-inch guns of the battleship Wisconsin have been pounding Iraqi artillery positions for days now in preparation for the ground war. Allied forces have reason to fear Iraq's big guns. They are among Saddam Hussein's most lethal weapons. Used with deadly consequence in the Iran-Iraq war, these Howitzers could shoot chemical and biological shells farther and more accurately than any field artillery in the U.S. arsenal.

REPORTER: What are those guns. Is that an accurate statement? Isn't that a superior capability he has?

ANNOUNCER: It's a question the U.S. prefers not to answer.

Brigadier General RICHARD I. NEAL, U.S. Central Command: We have heard about those reports, but we can't confirm them.

ANNOUNCER: Tonight, the story of those weapons and the man who made them.

PETER UNTERWEGER, Managing Director, Armaments Subsidiary, Voest Alpine: He certainly was, as far as artillery equipment was concerned, an absolutely technical genius.

ANNOUNCER: How did the U.S. support this man and what were his secret dealings with Saddam Hussein? And who killed the brilliant arms designer last March? Tonight on FRONTLINE, "The Man Who Made the Supergun."

NARRATOR: They'd been following him for months. They'd been monitoring his every move. Yet as he drove to his Brussels apartment on March 22nd, 1990, Dr. Gerald Vincent Bull had no idea that tonight he was the target of a hit squad.

DAVID HALEVY, Intelligence Analyst: It was definitely a complicated operation by a state intelligence organization and carried out by some 80 people, was outstretched for almost two years.

NARRATOR: For the last time, Gerald Bull rode the elevator to his apartment. In his lifetime, his guns and shells had been sold around the world. The weapons he'd designed were known for their deadly accuracy. Now, the knowledge he carried in his head had become too dangerous. His killers were waiting for him on the landing of the sixth floor. As he fumbled for his front door key, he was shot five times with a silenced automatic.

Mr. HALEVY: The execution of Gerry Bull was definitely not a lone assassination, but a state execution of an enemy of the state.

NARRATOR: He was buried in Montreal. He'd always inspired intense loyalty and the church was full. Charles Murphy was his lifelong collaborator.

Dr. CHARLES MURPHY, Ballistics Scientist, U.S. Army: Gerry Bull was a person who had a deep impact on a number of people around him. I could see the impact from his funeral, where there were 600 people there who came from all over the world, from all periods of his life, from the time he was a graduate student to the time he was in prison to the time he worked in Europe.

PETER UNTERWEGER, Managing Director, Armaments Subsidiary, Voest Alpine: He had such an international standard in the artillery world, of course, that, well, you couldn't go anyplace without tripping over Gerry Bull's name somehow.

NARRATOR: Bull's death only added to his legend and to the mystery surrounding his latest and biggest project.

Mr. HALEVY: Within a week or two weeks after the execution of Bull, you have an avalanche. You have companies under investigation. You have the British customs and MI5 moving very quickly. You have material appearing in the U.K. You have the same thing all over Europe.

NARRATOR: British customs had seized eight crates. Inside them were eight huge steel tubes. The manufacturers claimed they were part of a petrochemical plant ordered by the government of Iraq. But British customs had been tipped off that they were part of a weapons system, one that had been forged and milled to the exacting specifications of the late Dr. Bull. Put them together and you have the world's biggest gun barrel, over three feet wide and over 100 yards. But artillery experts questioned how a gun made of sections could contain the explosive pressures needed to fire a projectile 1,000 miles or more. But in Britain's Imperial War Museum, there is a record of such a gun and there's one man who's actually seen it.

Major ROBERT TURP, former MI10 Officer: As soon as I saw the supergun, it reminded me of this thing.

NARRATOR: Major Robert Turp is a self-described "gun-runner," but in World War II he was a member of MI10, a British Army intelligence unit. Its task was to assess captured German war materiel. In 1945, in a bombed-out munitions factory, he discovered the secret plans for a Nazi terror weapon, the V-3. The V stood for vengeance. Made from sections, the V-3 was 160 meters long. Turp also found parts of a prototype.

Maj. TURP: And it was in bits. It looked like a heap of plumbing. It was a set of tubes of 30-millimeter caliber, each about two meters long, screwed into each other. We took two or three of these links out and bound them together and fired and the gun didn't blow up. I'm convinced that Bull's design was based on that original design.

NARRATOR: Turp wrote a technical appraisal of the V-3. His report was added to the files of captured Nazi war secrets, filed and forgotten.

Maj. TURP: Somewhere in the War Office, there must be a report and I wouldn't be surprised if one of these reports isn't somewhere in the Pentagon. But remember, it was in 1946, '47.

NARRATOR: In 1946, Gerald Bull was only beginning his journey into the world of ballistics. At the age of 16, he had entered Toronto University as an undergraduate. Classmates remember him as high-spirited. He enrolled in the engineering faculty and studied aerodynamics.

INTERVIEWER: Did you like Gerry Bull?

Professor JULIUS LUCASIEWICZ, Research Scientist: Oh, yes, of course I liked him.

INTERVIEWER: Instantly, sort of--

Prof. LUCASIEWICZ: Well, I don't know that instantly, but I basically liked him. He was a busy and bright young man who did well and made sense.

NARRATOR: Bull did his post-graduate work at the Institute of Aeronautics, where at the age of 22 he became the youngest Ph.D. in Canada. Here he once worked 'round the clock for three days building a wind tunnel able to generate speeds of 3,500 miles an hour. Bull wasn't the most brilliant student in his class. He was more of a hands-on engineer than a theoretical scientist, but he did command attention and he had enormous tenacity.

Prof. LUCASIEWICZ: Of course, he was very stubborn, but I think stubborn people, provided they do things right, are very valuable because that's how something happens, in fact. It doesn't happen through 10 committees that dilute things and end up with possibly nothing.

NARRATOR: Previously classified film preserves an image of a brooding Dr. Bull. The Cold War had just begun and defense work provided a fast track for smart engineers. It is typical of the man that he was willing to get his hands dirty lifting the prototype of an air-to-air missile onto its primitive launching sled.

Dr. MURPHY: He was a brilliant engineer. He was a doer. He wanted to build things. He wanted to do things other people couldn't do. He wanted to promise to do things that people said couldn't be done.

NEWSREEL ANNOUNCER: The wraps are taken off secret Canadian defense research for the first time at Val Cartier near Quebec City. Here at the Canadian Armament Research and Development Establishment, a team of experts have been working since 1945 to create weapons that will blunt a possible attack by intercontinental ballistic missiles.

NARRATOR: Developing rocket systems for this early Star Wars system meant more work in wind tunnels. But testing models in hypersonic wind tunnels was time-consuming and expensive. Bull had a brilliant alternative. Why not shoot them down the barrel of a gun? Adapting existing technology was the nature of Bull's genius.

Prof. LUCASIEWICZ: He did very smart things at Cartier in a very simple way. He developed original and effective and incredibly cheap way of measuring aerodynamic properties by observing the signature that a model left by being first shot from a gun. By using very simple device, paper screens, by observing the signature, measuring them up, you could determine the progress of the motion of the model. Well, from this you can determine its aerodynamic characteristics.

NARRATOR: On press day, Cartier's golden boy posed by his cannon. This newsreel, not seen since the day it was shot, captures Bull at the beginning of his lifelong fascination and ultimate obsession with guns and artillery technology. But his chances to test the limits of gun technology came soon after when he moved to Montreal to head McGill University's Project HARP.

Dr. MURPHY: The HARP program, it stands for a High-Altitude Research Project and it was a proposal which came out of the studies that Gerry and I made as to what was the peak altitudes that various size guns could shoot to.

NEWSREEL ANNOUNCER: The man behind the project is McGill's 34-year-old professor of engineering science, Dr. Gerry Bull, an intense, impatient genius who's been working for five years on a cut-rate research program.

NARRATOR: Bull wanted to blast Canada into the space race by pioneering the use of big guns. In 1963, a U.S Navy landing craft beached in Barbados. The U.S. Army and the Canadian government were funding HARP. A 16-inch cannon with a barrel 60 feet long was to be Bull's mammoth test tube.

REPORTER: I'm reporting to you from Barbados, where this week, McGill University entered the operational stage of its Project HARP--High Altitude Research Program. It's as unlikely a project that ever jointly involved a university, half a dozen Canadian companies and the United States Army.

NARRATOR: The U.S. Army presence was a sensitive issue at HARP, where Dr. Bull liked to stress the peaceful purpose of his projectiles.

REPORTER: These were tense minutes for Dr. Gerry Bull. Years of calculation, trials and errors, would soon be put to the test. Would the projectile behave as miniatures had in the laboratory? More than 60 cameras were on hand to record the shot. The cannon was elevated to 80 degrees, higher than any of its type had ever gone before. Cameramen were moved away from their site.

NARRATOR: As the countdown continued, Dr. Bull was the last to seek refuge in the HARP bunker. It was hard to avoid questions about the military's interest in the gun.

REPORTER: Well now, this gun was commissioned for peaceful research. How do you explain using the data for the military?

AMERICAN ARMY OFFICER: Well, I think that may be just a matter of semantics, really. It was commissioned for peaceful research, but all of the Army's research is necessarily headed toward the things the Army is interested in.

GERALD BULL: Well, that is a--that's rather a tough question. We felt that the Americans would be more interested in the technique because of their very diversified program and their known diversified approach to all problems. They'd be--we thought they'd be more receptive to coming out with something that was perhaps not as conventional.

NARRATOR: It was during HARP that Bull began searching the military archives for the secrets of Germany's master gun-builders of World War I. They had produced a 420-millimeter howitzer called Big Bertha. They had also designed giant coastal batteries and a long barreled gun with a range of 60 miles or more.

Dr. MURPHY: Gerry's concern was always what could you do bigger and better, what forefronts of engineering capabilities could he push. And during the HARP program, obviously, we had used all the guns that were available then. In the process of doing that, we got particularly interested in what's called the "Paris gun," developed and used in the spring of 1918.

NARRATOR: Built by Krupp, the Paris gun shelled the French capital from a range of 75 miles. It was the first city-busting terror weapon, but the Germans destroyed it immediately after the armistice.

TERRY GANDER, Artillery Expert: It's one of the mysteries in the post-World War I era, exactly what happened to all the ballistic data that was involved with the Paris gun. Gradually it has emerged that Bull himself had quite a hand in unearthing a lot of it and remodeling most of it using computers.

NARRATOR: Bull and his partner Charles Murphy actually wrote about the Paris gun. In their book, they calculated the gun's geometry and its internal ballistic behavior.

Mr. GANDER: It seems to be sort of a major sort of a guiding light throughout his commercial and scientific life.

NARRATOR: The most obvious lesson to be learned from the Paris gun was "think big." To achieve additional range, the German engineers had made a sectioned gun barrel. Bull did likewise, joining two 16-inch Navy guns together. In 1966, Bull's launch team set the world altitude record for a gun-fired projectile. Bull was aiming to enter the space race with his big gun.

Dr. MURPHY: Obviously, one difficulty of shooting from a gun is that you have very high accelerations, much higher than a rocket. A rocket might have acceleration of 30 or 40 G's. In the case of the 16-inch gun, the acceleration is, like, 20,000 G's. So with accelerations that size, you had to worry about designing your payload to withstand it.

NARRATOR: Unless the problem could be solved, it would be impossible to shoot sensitive electronic packages into space. Simply increasing the amount of propellant would damage the payload and wear out the gun. But doubling the length would halve the acceleration because the payload would have twice as far to travel to achieve the same speed. A longer gun also needs less propellant to achieve the same range.

Dr. MURPHY: And, the natural thing to do was to say, "Well, we've got a 16-inch gun. What would a 32 do, twice as big?" So we went through engineering calculations at that time and reported on it in unclassified reports about what would be the performance of such a size gun.

NARRATOR: Bull's calculations included guns that were three, four and five feet wide. Larger calibers would reduce the G forces inside the barrel. This was essential if Bull was to achieve his dream of putting a gun-launched satellite into space. Photographs from the time show the strain on Bull. To keep HARP going, he had to please both the Canadian government and the U.S. military.

Professor GEZA KARDOS, HARP Site Manager: If you want to continue on your research, you have to get your funding from where you can. And if the military are going to put in the funding, that's where you get it from.

Dr. MURPHY: The weapons application is, if you like, the standard use of guns. I think he was interested much more in the nonstandard, but of course, similar to von Braun, he had to work both sides of the technology to achieve his goals.

Maj. TURP: What you put in the projectile was not Bull's concern, and I suspect this HARP project ties up with the gun. A gun that, after all, can put a projectile into orbit can certainly put one up and down on the ground somewhere.

Mr. GANDER: In fact, he was talking in terms of using one-meter guns in on-paper studies in about the mid-1960s. He was talking about 6,600 kilometers ranges with no trouble at all.

NARRATOR: The Army saw space as the next battlefield, so Bull proposed a special shell to shoot down incoming ballistic missiles. With the Army calling the shots, he also wrote a report that's still secret. It dealt with the homing devices, ballistics and terminal guidance systems for a gun-launched orbiting nuclear bomb. For the Canadian government, HARP was becoming too militarized. It withdrew its funding.

Mr. BULL: I would say the Canadian government in the first years of the 1960s lived up to everything I had expected. That is, we were--we couldn't be as big as the Americans or get involved in that stuff, but we could be the best in what we're doing, and that was important. It was when the idea of having the best of something dropped into being mediocrity and just doing nothing. That's the disheartening thing.

NARRATOR: In 1967, the big gun fired for the last time. The Pentagon had pulled out in favor of missiles. Bull lost his funding in the U.S. and Canada.

Prof. LUCASIEWICZ: I suspect that perhaps he just made too many enemies, because certainly he was not prepared to put up with nonsense and he cut the red tape in many places. I am quite sure of that.

Dr. MURPHY: He's famous for remarking maybe on one occasion, referring to some of the people in headquarters as "cocktail scientists." And this created a very difficult atmosphere in those who felt he was referring to them and I'm sure they remembered that for some time.

NARRATOR: Desperately disappointed, Dr. Bull returned to Quebec. Here he acquired an 8,000-acre site that straddled the border between Canada and the U.S. He went into the arms business with a company called the Space Research Corporation. From the air, it was possible to make out a firing range and on it, a big gun just like the one on Barbados. There's no doubt where Bull's heart lay, but for the moment his long-range dreams had to be put on hold. He had some contracts with the U.S. Defense Department, but he needed new customers and what they wanted were smaller conventional weapons. Once again Bull showed his genius for making new technology from old. Bull's corporation produced a package for third-world armies to modify and upgrade old gun systems and he began to rethink conventional artillery assumptions from barrel to breech. The result was his own extraordinary invention, the Gun Canada 45, the prototype for a new 155-millimeter Howitzer. Later versions bore Dr. Bull's signature, the longer barrel, which to this day can outshoot anything in the armories of NATO or the Warsaw Pact. Artillery specialists came, saw and were impressed.

CHRISTOPHER FOSS, Jane's Armour and Artillery: I met him once when I was in Canada in the late 1970s when we were taken over there just to see the GC-45 that was demonstrated coming into action and firing a number of rounds. Basically, he developed a 45-caliber barrel that enabled you to fire a 155 projectile to a range of 40 kilometers, almost double the range of existing artillery at that time, and to do it with accuracy, because that is what counts.

NARRATOR: Bull's work on ballistics was considered so valuable that in 1973, by a special act of Congress, he was made a U.S. citizen. He had developed a brand new shell. Bull's extended-range, full-bore, 155-millimeter shell had base bleed at the bottom end. This released burning gases and reduced drag, giving it a range of 24 miles, 6 miles more than the standard NATO shell. Tests also showed it had twice the terminal lethality of its NATO counterpart.

The shell should have been a winner, but perhaps because Bull was still the outsider and not part of the Pentagon old-boy network, the U.S. Army didn't buy it. But Bull had gone into production. He desperately needed a large order. Then he found a customer, but with catastrophic results. His legal troubles began in 1977. This ship, the *Tugelaland*, was carrying a cargo of space research shells and gun assemblies. It was a voyage which violated a U.N. arms embargo and broke the laws of Canada and the United States because the *Tugelaland* was bound for South Africa. South Africa's army needed Bull's shells for its war against the Marxists in Angola. Washington had tilted toward the South Africans in the war and supplying Bull's shells to them would serve that policy. The CIA promised to help. For them, it would be a deniable operation.

JOHN STOCKWELL, former CIA Agent: The way it would be handled would be that South Africa would be told where these rounds were available, these 155 rounds, and that they could contact and make the arrangements themselves.

NARRATOR: The case officer was a Major Clancey.

Mr. STOCKWELL: Clancey would definitely have been following orders. He would have been working with Africa division chief on this.

NARRATOR: Major John Clancey III was the CIA paramilitary officer given the job of finding shells for the South Africans. Through a CIA arms dealer, he was put in touch with Bull's Space Research Corporation.

Mr. STOCKWELL: He told me himself that he was looking for some 155 rounds and that he had found some.

NARRATOR: He had found them in Belgium. Here Bull had opened an office to market his shells. The man who had helped him set it up was an American arms dealer called Jack Frost.

JACK FROST, Arms Dealer: I told him that if they had no artillery capability that the acquisition of Space Research Technology was rather useful.

NARRATOR: Shortly after that conversation, a party of South Africans flew to the United States to meet Dr. Bull, but they hadn't told Frost about their visit.

Mr. FROST: I heard of the visit to SRC by a friend of mine who described it this way: "There's a load of money to be made. The South Africans are in here doing all kind of business."

NARRATOR: The visit to Space Research infuriated Frost, who feared he was about to be cut out of his 10 percent commission by Dr. Bull.

Mr. FROST: I immediately called SRC, Dr. Bull, and he admitted he had a visit. And at that point, I said, "Well, you can't continue this because it's illegal and you'd better stop immediately." His response was, "Well, Jack, we don't think we'll do anything because it looks as if it's too chancy."

NARRATOR: To make doubly sure he wasn't being double-crossed Frost informed the United States Office of Munitions Control that Bull and the South Africans were discussing breaking the arms embargo, but it made no difference. Within weeks, Bull ordered 60 cannon barrels and 50,000 semi-finished shells from a U.S. Army munitions plant. Apparently someone in Washington was pulling strings and cutting red tape. Approval that could have taken months was granted in just four days.

Mr. STOCKWELL: Four days is impressive. They gave it a top priority. They concentrated on it and pushed it through. It wasn't put on a back burner. It wasn't committed out.

NARRATOR: Altogether Bull smuggled 50,000 shells worth \$30 million. He had done so with the apparent knowledge of the U.S. government, but he was transferring more than shells. He was passing on technology that would in time enable the South Africans to make their own sophisticated artillery. But Bull's activities were now being investigated in four countries. He was also beginning to feel the heat from the media. Naively, perhaps, he agreed to be interviewed by a British reporter about some shells that were supposed to have been shipped to Spain.

REPORTER: But you're sure they're in Spain?

Dr. BULL: I know that--well, I--yeah, some of our people said they've talked to them and seen them in Spain and--

REPORTER: According to what we've been told, they were reexported out of Spain on a ship called the *Breezand* and it gave its destination as Canada. Only guess what?

Dr. BULL: Where did it go?

REPORTER: South Africa.

Dr. BULL: South Africa?

REPORTER: Uh-huh.

Dr. BULL: We--I--I haven't got a--we'll certainly check it.

NARRATOR: Now back home in the U.S., Bull was also being investigated by special agent Larry Curtis of the U.S. Customs Service. He was surprised to find evidence leading to the U.S. government.

LAWRENCE CURTIS, former U.S. Customs Special Agent: Well, during the course of the investigation, I went to the CIA in Washington. The door was shut on me. I was not allowed to make direct contact.

NARRATOR: He also found the letter from the arms dealer Jack Frost to the Office of Munitions Control.

Mr. CURTIS: He had information which he had supplied to the Department of State prior to our investigation. Nothing, to my knowledge, was followed up on of his original information.

NARRATOR: But the evidence against Bull was mounting. Behind the smiles, his life was falling apart. His companies were going bankrupt. Even though one part of the U.S. government had seemed to encourage his dealings with South Africa,

another was now bringing criminal charges against him.

Mr. CURTIS: We were talking about indicting 15 individuals, I believe, three countries and five corporations.

NARRATOR: But then, the weekend before the trial, Bull and his partner, Rogers Gregory, went into a huddle with the U.S. attorneys. A deal was being struck.

Mr. CURTIS: When I was advised the following Monday that Bull and Gregory were the only ones being indicted, I was totally surprised, very disappointed and bewildered as to the results.

NARRATOR: The next day Bull pled guilty. The effect was that evidence of government cover-up and CIA collusion in Bull's South Africa deal was never heard in open court.

Mr. CURTIS: I was told that the reason we never went any further was because there had been a phone call from the White House. I took that to mean there had been a phone call from the White House to main Justice stating "Don't go any further with the investigation."

NARRATOR: Whatever happened behind the scenes, Bull was left to fend for himself.

Dr. MURPHY: At the time he did plead, he did not think that he would go to jail. He thought it would be a fine. He was very upset by his jail term and it colored his life emotionally. He felt rejected by Canada and by the U.S. during that period of his life.

NARRATOR: To the end of his days, Bull was obsessed with what he saw as the injustice of his four-month jail term.

Mr. CURTIS: I would say he was not a happy camper. He was very embittered against the United States government and the government of Canada. He made statements to different newspapers that he would never set foot in North America again.

NARRATOR: After his release, Bull took a Caribbean vacation. He rested up, took stock and gave vent to his feelings to Canadian television.

REPORTER: The only way Dr. Bull can get even is to sell his brains now to a foreign country. He says he's turned his back on Canada for good.

Mr. BULL: I feel more than betrayed. I feel that all of the memories and all the traditions and everything that I thought the country stood for has been betrayed. If they think they've degraded me, they haven't. If they think they've broken my spirit, they haven't. What I did and what I built, to see it cheapened, to see people trying to degrade me personally as a common criminal--for what?

NARRATOR: Bull moved to Brussels, to the international center of the arms business. Word of his arrival reached men like Sarkis Soghanalian, the Miami-based arms dealer.

SARKIS SOGHANALIAN, Arms Dealer: I had a friend in Paris, he said that Gerry Bull is out of jail. This was in 1981, now. And he's not living anymore in Canada or in the United States. He's living in Belgium, in Brussels. I said, "When you see him, say 'hello.'"

Maj. TURP: Everybody in the arms business fetches up in Brussels. In the same way as they say all roads lead to Rome, all guns point from Brussels.

NARRATOR: 1981 was a good year to be in the arms business. Iran and Iraq were fighting a protracted war. In Iraq, they called it "Saddam's war." Despite the bravado, Saddam's war was not going well. Saddam needed better artillery than his outdated 130-millimeter Soviet guns. Remembering Bull's ability to upgrade old guns, Sarkis Soghanalian spotted a business opportunity.

Mr. SOGHANALIAN: I brought this to Gerry's attention and he said, "Yes, let's see what we can do." They tore the gun apart. Time went by, six months, seven months. I never get anything from Gerry except paying him money. At that time, I find out that Gerry is flirting with Chinese to build a gun over in China and sell it to us.

INTERVIEWER: So he's playing all sides of--

Mr. SOGHANALIAN: He plays, you know, two ends against the middle. You know, you can never get anywhere with this guy. And which I said, "Gerry, you go your way and I'll go my way."

NARRATOR: Despite U.S. restrictions on the transfer of military know-how to China, Bull, still an American citizen, had been dealing with Beijing for years. But Washington was tilting toward China and in Bull's case, the law was not being rigorously enforced.

Mr. FOSS: Basically, the Chinese had a large number of old systems of Soviet design. They really wanted to have systems with a longer range and that's where Dr. Bull came in with his 155 45-caliber systems.

NARRATOR: It was the South Africa story all over again. Bull signed a three-and-a-half-year contract to engineer and train the Chinese to manufacture their own 155 Howitzers. He did so without a license from the U.S. government to transfer technology. Bull's dealings with China came to light one evening in 1984 when one of his close associates, Dennis Lyster, was stopped at the Canadian border by U.S. Customs.

Mr. CURTIS: Late in the evening of March 23rd, I was notified that Lyster was at the port of North Troy, Vermont, and that he was carrying a metal suitcase and that the suitcase had been examined and it contained a great deal of documents.

NARRATOR: Dennis Lyster was carrying computer disks, blueprints and a contract with China.

Mr. CURTIS: As I recall, there were 10 individual contracts and, in fact, the contracts were initialed with the initials G.V.B., which I recognized as the initials of Dr. Bull. The contracts had an estimated value of approximately \$25 million.

NARRATOR: Curtis had a strong case against Gerald Bull, but in 1984 relations between Washington and Beijing were close. Curtis was shut out once again.

Mr. CURTIS: There were some classified documents, they never were declassified. I never got any action on this and I followed up on it two or three or four times, attempting to get these documents declassified so that I could present it then to the U.S. attorney, grand jury, whatever was needed.

NARRATOR: But by now Bull had another deal in the works, this time in the Austrian city of Linz. Adolph Hitler used to paint watercolors in Linz. He built a munitions factory here and named it for Hermann Goering. Today it's a steelworks called Voest Alpine, which in the early '80s was interested in Bull's guns.

PETER UNTERWEGER, Managing Director, Armaments Subsidiary, Voest Alpine: Dr. Gerald Bull, he was a very outspoken man. He was an interesting character. He emptied a bottle of whiskey so fast, you couldn't compete with him. On the other hand, he certainly was, as far as artillery equipment was concerned, an absolute technical genius.

NARRATOR: Voest Alpine bought a license to manufacture Bull's GC-45 cannon. It may have been the best gun in the world, but it was expensive to develop and build. They lost millions.

Mr. SOGHANALIAN: Gerry Bull apparently didn't treat them right when he was selling the technology. Gerry never deals you something complete, you know? If he gives you a cup, either the handle is missing or the edge is not straight round. That's what Gerry was.

NARRATOR: But in the end the Austrians smoothed out the bumps in the system. Iran and Iraq soon were customers. The United States had banned arms sales to both countries, which were then at war. But Washington favored Iraq and had reason to look the other way on transactions there. And Saddam Hussein was sold on the Austrians' Towed Howitzer.

Mr. UNTERWEGER: The Austrian minister of the interior had a discussion with Saddam Hussein and, well, Saddam said, to make it short, "Well, where are our guns?" and "Can't you speed up delivery? We require them urgently."

NARRATOR: By now, Saddam's war had bogged down into bloody trench warfare. This is where artillery is king of the battlefield. Saddam Hussein ordered 200 of the Austrian guns and used them to great effect. Bull's reputation with the Iraqis was so high that by the late '80s, his draftsmen were busy at their drawing boards, designing two brand-new guns for Saddam Hussein.

Mr. FOSS: They had Towed artillery, which does have some battlefield limitations, so he developed two new self-propelled artillery systems, the 155 and a 210-millimeter. And both of those were shown for the first time in Baghdad last year. The 210 is the longest-range self-propelled artillery system in the world. It goes out to 57,000 meters, so that is unique.

NARRATOR: But it also bears a striking resemblance to a self-propelled gun called the G-6. Based on Bull's designs and made in South Africa, it too has been sold to Iraq. The South Africans have also sold 200 of these to Iraq. It's the G-5, a direct copy of Bull's own GC-45.

Rep. HOWARD WOLPE, Chairman, Foreign Affairs Subcommittee: We have clear evidence that American technology has been illegally exported to South Africa. From there it has been reexported to terrorist nations, to Iran, to Iraq.

NARRATOR: Congressman Howard Wolpe's House Foreign Affairs Subcommittee investigated Gerald Bull's dealings with South Africa and the U.S. government's involvement.

Rep. WOLPE: The bottom line here is that because we have been so lax in our enforcement of American laws, we are now finding American-made technology in the hands of the Iraqi forces that are pointing their cannon at American soldiers. That's outrageous.

NARRATOR: Bull's guns can fire high-explosive, chemical, biological and possibly nuclear shells. They fire farther and are more accurate than allied guns. Saddam Hussein has bought 200 from Austria and 200 from South Africa. Bull's Howitzers are now in the front line of the Gulf war. But to Gerald Bull this was simply a means to an end. Although the big gun was abandoned on his Canadian testing range, he had not forgotten about it. To revive the project was his pet ambition. All he lacked was the money. And when he drank he talked of superguns.

Mr. UNTERWEGER: The more whiskey he drank, the more he started talking about the idea of producing a supergun. You see, the more whiskey he and my colleagues drank, the farther the gun shot. But, in the end, it was about 1,000 kilometers. But they also said technically, technically speaking and theoretically speaking, he could even produce a gun which shoots 2,000 or 3,000 or whatever kilometers. But this was a time when I normally went to bed.

NARRATOR: Gerald Bull had his own bedtime reading. He was going back to World War II, back to the V-3 terror weapon and everything he could find out about it. In the process he unearthed Major Turp's long-lost report.

Maj. TURP: Quite by accident, I found him staying in the same hotel that I always used when I went to Brussels, and naturally we used to meet occasionally in the evenings coming down the lift and we'd sit and talk and scribble on bits of paper and we would discuss various features of guns, long-range guns, because I knew by that time that Bull was only interested in long-range guns. He said, "Of course, you knew the German gun." Well, I did know the German gun--not all that well, but I think I'm probably the only one that ever fired the thing.

NARRATOR: Early in 1944, the Germans built the full-size version of Turp's gun at Pas-de-Calais, 95 miles from London. Thinking it was something else, the R.A.F. fortuitously bombed it. When Allied troops finally overran the site, they found the gun in ruins. To be on the safe side British troops blew it up again, but not before a war artist had produced this impression. It showed that the Germans had sectioned the gun barrel to control the internal pressure.

Maj. TURP: In an ordinary gun, what in fact you're doing, you're hitting the projectile with a hammer, a very heavy hammer, to send it out, rather like you hit a golf ball with one bang. Under this system, you would rather push it at a gathering momentum. That's so your pressure will be kept up behind the shell for its full length of barrel travel.

NARRATOR: Bull's fascination with superguns would finally bring him back to the United States. In 1985, the Defense Department wanted to hear his ideas about a big gun.

FRED QUELLE, Government Defense Physicist: Gerald Bull was an essential ingredient to any program such as this and in my opinion, if an activity like this were going on, wild horses would not keep Gerald Bull from being in the middle of it. This was his pride and Joy.

NARRATOR: Gerry Bull came to Washington armed with volumes of data about the application of his gun. Fred Quelle, who

was there, still has the visual aids with which Bull illustrated his talk.

Mr. QUELLE: What he did was to first summarize the whole history of gun development, including the Paris gun, the Big Berthas, Doras and so on that the Germans built and then he went in detail through the HARP program.

NARRATOR: During the HARP project, Bull had always stressed the peaceful nature of his research, but what he was now proposing was an intercontinental cannon. The applications he was illustrating were strictly military.

Mr. QUELLE: Gerry outlined how you get ranges that could go all the way out to 6,000 miles.

NARRATOR: And then Bull unveiled his masterwork, the plans for a supergun that he'd been refining for 20 years, sectioned like the Paris gun and with the low internal pressure of the V-3, a gun which he described as industrially feasible and costing a mere \$10 million. But once again his hopes were dashed. The Pentagon passed on the project.

Mr. QUELLE: Well, let's put it this way. If one's ideas and capabilities are not appreciated at one location, it is only natural to see if you can find another customer. And, as near as we can ascertain, Gerry did find a ready and willing customer in Saddam Hussein in Iraq.

NARRATOR: The best evidence suggests that Bull was in Baghdad in 1988 and that that was the year Saddam Hussein gave the go-ahead for the supergun project. A cheap, simple strategic weapon, its attractions for Saddam Hussein were obvious to Israeli military men.

General AVRAHAM BAR-DAVID, former Chief, Israeli Artillery: They don't have air superiority. They don't have the know-how in final guidance and therefore the last solution that they can have, it's the supergun.

Mr. GANDER: Taking the case of Iraq, you would only need two guns, possibly, one facing East while one's facing West and you can command most of the Middle East.

NARRATOR: For Saddam Hussein, the supergun could do everything his missiles and Scuds could do, raining high explosives onto enemy cities. Unlike Scuds, the shells from a supergun could not be shot down by Patriot missiles and they would need no complicated electronic guidance systems.

Mr. GANDER: We're not talking about pinpoint accuracy. We're talking about accuracy of hitting a city. In Tel Aviv, taking the prime target, everything is compressed into a relatively small area and it's a relatively small target and it could be neutralized relatively quickly.

Maj. TURP: It would be literally the famous bullet that fires in the air. In this case, it wouldn't be "Where it lands I know not where." You would know exactly where it was going to land.

NARRATOR: Building a supergun was a cloak-and-dagger operation. To conceal his true purpose, Bull subcontracted different sections of the supergun to different factories. Word got around that he was looking for people with the right skills.

Maj. TURP: He asked me to find two highly qualified workshop engineers, that is to say men that were used to producing heavy, large-caliber barrels. I believe he was offering these men something like \$30,000 or \$40,000 a month.

NARRATOR: The huge tubes that made up the barrel were engineered in England. The trunnions, or supports for the barrel, were found in Greece. Pipes, pumps and valves from Switzerland made up the recoil system. Seventy-five tons of steel parts forged in Italy formed parts of the breech. Altogether, companies in eight countries were involved.

Maj. TURP: Now, Dr. Bull spoke to me about powder and he was obviously very interested in the types of powder used. In a gun like this, you will want a comparatively slow burning powder.

NARRATOR: Bull's powder was made at a factory in north Belgium. The workers were paid extra money, and the work was done in great secrecy. But then the factory's parent company went broke and was taken over by a British company headed by Dr. John Pike. When Pike entered the headquarters of his new acquisition, he found a highly suspicious contract in the company's files.

Dr. JOHN PIKE, Astra Defense Systems: It was a contract for the supply of two types of a particular gun propellant. The gun propellant was not in itself unusual. It was the sort of propellant that can be used for a number of different systems. However, what was unusual was the actual physical size of the pieces of propellant that were to be supplied.

NARRATOR: Pike also came across a memo written to Dr. Bull by his associate Dennis Lyster. In it, Lyster detailed the test results for two kinds of propellant. The Belgian factory had been making propellant for two systems—one 350-millimeter prototype and a huge 1,000-millimeter gun. That's a 39-inch diameter.

Dr. PIKE: The story is that the System 350 propellant was intended to be used as the propellant for this experimental gun. Once the experimental gun was working, then the 1,000-millimeter system gun could be finally designed. Its propellant could be finally designed.

NARRATOR: The tubes seized in England came in two sizes--350-millimeter and 1,000-millimeter. Reportedly the 350 had been tested in 1989. Later that year, a firm order was placed for the 1,000-millimeter propellant. By the end of 1989, the plot to build the supergun had been penetrated, and now Dr. Bull himself had become a target of Israeli intelligence.

Gen. BAR-DAVID: Carrying all his own known knowledge with him and not cooperating with too many people definitely was a key strategic point that if you take it--take him out, you are losing control of the entire system.

Dr. MURPHY: In a sense, he had no governmental protectors. His government of his birth had rejected him and the government whose passport he carried had imprisoned him. He was, in a sense, vulnerable, from a standpoint of being a person who would not have a lot of people concerned if he was killed.

NARRATOR: Bull apparently knew his life was in danger. He told friends about threats from Israeli intelligence, Mossad. An Israeli journalist who specializes in intelligence matters, David Halevy, investigated Bull's death for FRONTLINE. His account is based on briefings from a senior officer in Israel's ministry of defense, a top Mossad official and conversations with two field agents.

Mr. HALEVY: Another warning was offered to Bull. A guy saying, "Sir, if you carry on, we will have to take harsh action against you, against your companies and against the people involved with you." Basically he walked away from the meeting. I mean, he said "I don't want to listen. I've heard enough." With Bull, it was a lost case. His fate was sealed. Two teams of assassins arrived in Brussels.

NARRATOR: One team waited at his apartment building while another was outside the office as Bull was picked up to be driven home. Only days before, his prototype gun had been tested in Iraq. It seemed Bull's life-long ambition to build a supergun was about to be fulfilled.

Mr. HALEVY: And the moment he leaves the office, they click on the closed-circuit network, indicating that he left the office and that they are following him.

NARRATOR: Bull was apparently oblivious to the danger he was in.

Mr. HALEVY: The moment he entered the apartment building, two clicks. And while he is going up to the sixth floor, the team that was in the apartment building waiting in ambush is rushing to the sixth floor, through the emergency staircase, not using the elevator. Gerry Bull and the team appeared together at the entrance to his apartment. One guy opens fire, five shots. You don't hear any noise. The only thing you would hear is a "Phut! Phut!" kind of noise and they are gone.

NARRATOR: According to Halevy's sources, the hit team was driven to the train station in Brussels and took the first train out of town to Germany. It had taken five bullets to end the plot to build the supergun, but Bull's legacy remains in the Gulf. At least 500 of his advanced 155-millimeter Howitzers, the best ever built, stand ready to be used by Saddam Hussein against allied troops. And the supergun--will its design, like the great guns of World Wars I and II, be rediscovered, to be built by another Gerald Bull?

ANNOUNCER: Next time on FRONTLINE; while the world is mesmerized by the Gulf war, why did Gorbachev engineer a military crackdown in the Soviet Union? Correspondent Hedrick Smith explores the role of the Soviet military in the undermining of U.S.-Soviet relations and the use of force in the Baltics. Next time on FRONTLINE, "Guns, Tanks and Gorbachev."

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