



The Bomb That Isn't There. Israel's Last Argument



[Michael B.](#)

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After a brief historical detour, we return to the promised story of Israel's nuclear shield. In '[Why Didn't America Destroy the Soviet Union?](#)' and "[So Why Didn't America Destroy the Soviet Union?](#)" we traced how the bomb became a weapon of intercontinental warfare, and why technical superiority does not in itself amount to a decision to start the war. Now we face a different case: a small country that needed one last argument in case all the others stopped working.

Israel officially neither confirms nor denies possessing nuclear weapons. Its longstanding formula is that it will not be the first to 'introduce' nuclear weapons into the Middle East. What exactly 'introduce' means is left unexplained, too. Announce the bomb? Conduct a test? That ambiguity has endured for decades. [1]

The unofficial position has long circulated as a joke: we have no nuclear weapons, but if the state's survival is threatened, we will use them. Not an official quotation, of course. But a perfectly suitable way to begin our story.

This story has a remarkable cast. A technician pulled between left-wing ideas and a search for religious meaning. A woman who offered him a Roman holiday. A South African naval officer working for Soviet intelligence. Tiny electronic tubes that inspired a major film. French ministers, engineers, and an aircraft designer who survived Buchenwald. And a flash over the ocean that nobody ever claimed. More than enough material for a spy novel. Behind the intrigue, however, stood very tangible things: a reactor, a reprocessing plant that extracted plutonium from uranium fuel, and a missile.

The Man with the Camera

We have to begin with a question: how do we know anything at all about a programme the state does not acknowledge?.. From other countries' archival records, participants' accounts, cases of industrial espionage, and intelligence assessments. One of the most spectacular breaches, though, came courtesy of a man who brought a camera into a place where cameras were forbidden.

Mordechai Vanunu was born into a Jewish family in Morocco in 1954. In 1963, his family moved to Israel and settled in Beersheba. He served in the army, then in 1976 took a job as a technician at the nuclear research centre in Dimona, in the Negev desert. He worked there until 1985. [2]



Mordechai Vanunu, a technician at the Dimona nuclear centre. His photographs and explanations brought the secret production facility into public view.

Vanunu's life took one turn after another. While working at Dimona, he enrolled at Ben-Gurion University in Beersheba to study philosophy. He then concluded that someone from a Moroccan family had little chance of getting ahead in Israel: European Jews got everything. He grew close to Arab students and left-wing activists. [2-3]

The security service knew about his political activities and summoned him for questioning. Yet he continued going to work. And he went with a backpack containing his university textbooks.

In 1985, Vanunu learned that he was being made redundant. Shortly before leaving, he decided to photograph what he saw at work. He later explained that he wanted to warn people about the danger of nuclear weapons and denied acting out of revenge for losing his job.

Shortly before his dismissal, he brought a Pentax camera into the nuclear centre in his usual backpack and shot two rolls of film - about 58 photographs. [3]

After losing his job, Vanunu went travelling. He had the money: his redundancy had come with a severance payment.

First Thailand, then Nepal, where he became interested in Buddhism. [2-3, 30]

From Nepal, Vanunu made his way to Australia. He settled in Sydney, met members of an Anglican congregation, and converted to Christianity... Throughout all this, the two rolls of film from Dimona travelled with him. [2-3]

He had them developed only in Sydney. For several months, he had been carrying what was arguably Israel's most important state secret, while risking its loss in the most mundane way imaginable: the film could have deteriorated. But the photographs survived.

In Australia, Vanunu met the Colombian journalist Oscar Guerrero and told him about the photographs. Guerrero advised him to go to England: a major newspaper might pay handsomely for material like that. He helped him get in touch with The Sunday Times. In September 1986, Vanunu arrived in London with the film and explanations of what the photographs showed.

Naturally, the editors did not rush to print the scoop. The story was simply too extraordinary: a complete stranger turns up with photographs of a secret nuclear production facility. Above all, the journalists feared looking like idiots who had fallen for a hoax. So, they sent the photographs to be checked.

They were examined by nuclear specialists, including Frank Barnaby, a British physicist who had worked at the Aldermaston weapons establishment, and Theodore Taylor, an American physicist and nuclear weapons designer. They questioned Vanunu and confirmed that this looked very much like a genuine nuclear production facility, and that the man knew what he was talking about. [4]

The newspaper was still preparing the story when a woman appeared on the scene.

A Roman Holiday - with a Sequel

While the newspaper checked his material, the lonely man wandered around London and met an attractive American woman called Cindy. Young, beautiful, outgoing. Sparks flew, and a passionate romance began. Before long, Cindy suggested a holiday together in Italy.

A friend of hers lived in Rome, she explained. The friend happened to be away, leaving her flat empty. They could spend a lovely few days there, just the two of them. Vanunu agreed. Of course he did...



Cheryl Bentov, the Mossad operative whom Vanunu knew as Cindy.

On 30 September 1986, they flew to Rome and went to the flat. Mossad operatives were waiting for Vanunu there. Mossad is Israel's foreign intelligence service; Cindy herself was later identified as Cheryl Bentov, an operative of the same service. The trip was part of a kidnapping operation.

Vanunu was restrained, drugged, and secretly transported by sea to Israel. According to his recollection, he regained consciousness aboard the vessel. [2–3]

The publication itself could not be stopped, however. On 5 October 1986, The Sunday Times ran its report on Israel's nuclear project. By then, Vanunu had vanished from the journalists' view, but the whole world had seen his photographs.

Vanunu was tried for treason and espionage. In 1988, he received an eighteen-year prison sentence and served every last day of it, walking free on 21 April 2004. He spent about eleven years in solitary confinement. His release came with restrictions, including a ban on leaving Israel. [2]

He managed to tell the story of his kidnapping without saying a word. On the way to court, he pressed his palm against the car window. Written on it were the place and date of his abduction - Rome, 30 September 1986 - and the number of the flight he had taken. Journalists photographed the message. [31]



Vanunu shows photographers the message on his palm about his abduction in Rome. December 1986. Source: Nuclear Weapon Archive. [31]

The public was naturally fascinated by the beautiful woman, the romance, the kidnapping, and the secret sea voyage. Israelis, meanwhile, had questions for their own security service, so widely respected around the world: how had a man with those political views remained employed at Dimona, and how had he managed to bring in a camera at all? For our story, though, something else matters more: what did the nuclear specialists see in those photographs?

What the Specialists Saw

The photographs showed the specialists a complex: a reactor and a plant for extracting plutonium from uranium fuel elements. Vanunu had worked in the underground reprocessing facilities and could explain exactly what he had photographed.

Using the photographs and Vanunu's explanations, the specialists estimated the complex's capacity at about 40 kilograms of weapons-grade plutonium a year. What particularly surprised them, though, was the technical sophistication of the production process. [5]

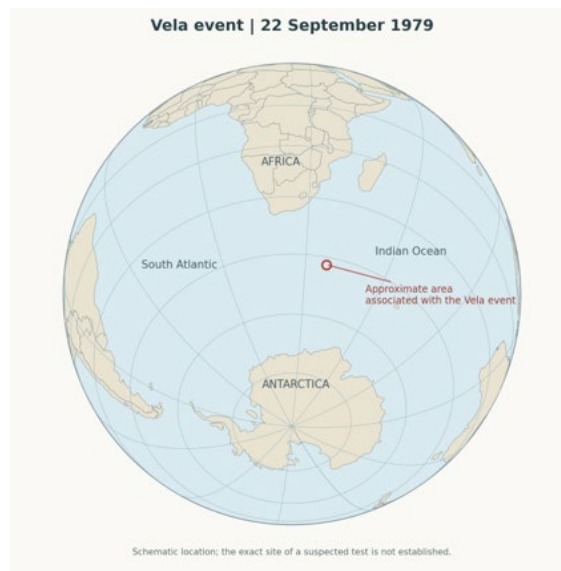
The photographs revealed signs of work with gaseous tritium for fusion boosting. The devices themselves looked remarkably compact. This was already a long way beyond the first generation of plutonium bombs. In [‘The Bomb in a Pocket’](#), we examined how a few grams of deuterium-tritium gas changed the development of compact nuclear weapons.

Even more surprising was lithium deuteride, a material associated with thermonuclear weapons. That meant Dimona was working in this direction, too. The presence of the material did not prove that a finished H-bomb already existed. But it raised an entirely natural question: if they had come that far, where had they conducted their tests?

This is a good moment to recall a strange flash over the ocean, seven years before the photographs were published.

The Flash Nobody Claimed

On 22 September 1979, the American satellite Vela 6911 detected a double flash of light over the ocean south of Africa. Satellites in this system had been designed specifically to detect nuclear tests. A double flash is a characteristic signature of an atmospheric nuclear explosion. Had somebody conducted a nuclear test? If so, who? [6]



The area associated with the Vela event of 22 September 1979. The schematic marker does not establish the exact location of the suspected test.

This was the region where the southern Atlantic meets the Indian Ocean, near South Africa's Prince Edward and Marion islands.

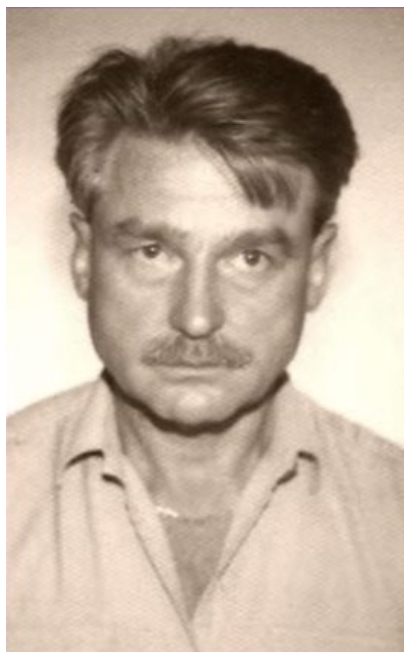
Nobody owned up. No nuclear power announced that it had conducted such a test. One of the leading explanations was an Israeli device tested with South African assistance. Military cooperation between the two countries already existed by then.

American specialists disagreed, however, about what had been detected. CIA experts considered the signal consistent with a nuclear explosion. A White House panel led by the physicist Jack Ruina favoured a non-nuclear event close to the satellite itself. [6–7]

By February 1980, President Jimmy Carter had noted in his diary that the view that this had been an Israeli test was circulating and gaining ground among American specialists. Yet convincing corroboration from radioactive fallout could not be obtained. Neither the nature of the flash nor those responsible were conclusively established. [6]

A South African Officer in Moscow's Service

Meet Dieter Gerhardt, a South African naval officer of German descent. His family moved from Germany to South Africa in the 1930s. Their German origins made life considerably more difficult during the war. Nevertheless, Dieter became a naval officer and built a successful career. And, at the same time, a career as a Soviet agent. [8–9]



Dieter Gerhardt, a South African naval officer and a longstanding source for Soviet military intelligence.

In the early 1960s, while in Britain, he offered his services to Soviet military intelligence: the General Staff's Main Intelligence Directorate, or GRU. He explained his decision in terms of his hatred of apartheid, South Africa's system of racial discrimination, and his desire to fight it. Soviet intelligence accepted the offer. The information he supplied was paid for all the same. [8–9]

The information began to flow. During service and training with the Royal Navy, Gerhardt gained access to information on naval weapons. Details of Sea Cat and Sea Sparrow surface-to-air missiles went to Moscow, followed by information on the French Exocet anti-ship missile. Back in South Africa, he worked in military procurement and at the armed forces headquarters. His access was no longer confined to the navy: he could see army projects, aviation programmes, and military cooperation with Israel. [8–9]

As he rose through the ranks, his access widened. Gerhardt later became commander of the Simon's Town naval base. He could read intelligence reports and information on Western surveillance systems in the South Atlantic. [8–9]

His first wife discovered his secret activities, and the marriage collapsed. His second wife, Ruth, became his courier instead. The family business ran for years: he obtained information, and she helped pass it on. But in January 1983, Gerhardt was arrested in New York, where he had gone for training, and handed over to South Africa. In December, he received a life sentence; Ruth received ten years. The judge explained why he had not imposed the death penalty: it had not been established that the information Gerhardt supplied had caused the death of any South African serviceman. [8–9]

Then apartheid began to crumble, the Soviet Union disappeared, and life imprisonment turned out not to mean life. In 1992, Russian President Boris Yeltsin appealed to South African President F. W. de Klerk on Gerhardt's behalf. Gerhardt was released. He later claimed that the 1979 flash had been a joint Israeli-South African test. He had not been present at the explosion, so this was the testimony of an informed man, but not an eyewitness. [9, 29]

Eight Hundred and Ten Tiny Tubes

Another intriguing episode involves the American engineer and businessman Richard Kelly Smyth. Between 1980 and 1983, he shipped 810 krytrons to Israel. Eight hundred and ten little tubes like the one in the photograph. [10]



An electronic switching tube illustrating the krytron story. Switching speed is what matters here; this is not the nuclear device itself.

A krytron is an electronic switch. It does not amplify signals or perform complicated calculations. It switches an electrical circuit on and off, but does so extremely quickly and consistently. Such devices found applications in nuclear technology, where precisely coordinated operation is particularly important. We explored why coordination matters in an implosion device in [‘Why Fat Man Was Fat. The Explosion That Had to Go Inward’](#).

Krytrons also have non-nuclear applications. They are, however, dual-use items: they cannot be exported without the necessary authorisation. Smyth bypassed that requirement, shipping them to Israel through his company, Milco.

He was charged in 1985. Smyth disappeared before his trial and was found only in 2001, in Spain. After returning to the United States, he pleaded guilty and was sentenced to forty months in prison. [10]

The Israelis explained that the tubes had been intended for medical research. They even returned 469 of them to the Americans. And the rest? According to the official explanation, they had been used up in different tests. Some came back; looking for the remainder was already pointless. [11]

An entire film was built around one such little tube: Frantic, Roman Polanski’s 1988 thriller starring Harrison Ford. An American doctor arrives in Paris, his wife disappears, and agents and intermediaries enter the story. Everyone is after a krytron hidden in a souvenir. In the finale, the hero throws the device into the Seine, in the spirit of ‘If I can’t have you, no one will.’ [12]



Harrison Ford and Emmanuelle Seigner in a promotional image for Frantic (1988). The film’s espionage plot revolves around a krytron.

In the film, all that intrigue revolves around a single tube. Smyth shipped 810 to Israel.

Those are a few of the episodes that became public. Now let us return to the beginnings of Israel’s nuclear programme: who helped build it, and why?

A French Bomb with Israeli Participation

Israel declared independence in May 1948. Contacts between its scientists and French nuclear specialists began as early as 1949. Among those involved were Ernst David Bergmann, a chemist and one of the founders of Israel's nuclear programme, and Francis Perrin, a French physicist who later became France's High Commissioner for Atomic Energy, the scientific head of the French Atomic Energy Commission. In 1952, the Israeli government established its own Atomic Energy Commission. [11]

Why France? First and foremost, because France was willing to help. Neither the United States nor Britain was prepared to cooperate with Israel in this way at the time.

There were several reasons. Veterans of the anti-Nazi Resistance worked in the French leadership, armed forces, and scientific and technical organisations. They had seen with their own eyes what had happened to Jews in occupied France and under the Vichy regime. Some sincerely wanted to help Israel, partly to make amends for their own country's wrongdoing.

There were less noble ways of exerting leverage, too. A survey published in 1999 by Warner Farr at the American Counterproliferation Center describes an account in which Israeli intelligence used information about the past of French collaborators. Exposure of their cooperation with the Nazis could cost them their position and career. According to the survey's author, such information was used to exert pressure. [11]

There was also a much weightier reason of state. The defeat of 1940 had been a national humiliation for France. Restoring its greatness and becoming a leading world power again was what many French leaders wanted. By the standards of the 1950s, a great power needed its own atomic bomb. France had possessed a strong school of nuclear physics before the war but now lagged well behind the United States and Britain.

Here was common ground for cooperation. Somehow, Israeli physicists whose names meant little to most people at the time possessed substantial knowledge that interested their French colleagues. France could offer an industrial base and facilities for testing. The result was a joint effort: Israel's bomb was French in many respects, but France's bomb also had Israeli participation. [11]

To simplify considerably, it was something like the partnership between a research institute and an engineering design bureau. At the institute, the bespectacled scientists think, calculate, and write equations. At the design bureau, engineers with pencils at their drawing boards turn scientific knowledge into hardware. The hardware goes to the test site. The results return to the institute, then back to the engineers. With corrections and redesigns, that is how the work moves forward. Something like this exchange took place between Israel and France.

After Suez

Specific discussions about a reactor began right before the Suez Crisis. In September 1956, Israeli representatives discussed the construction of a research reactor with French nuclear specialists. The chief negotiator was Shimon Peres, director-general of Israel's Ministry of Defence and later the country's prime minister and president. Before long, the cooperation took on an entirely different scale. [11]

On 26 July 1956, Egyptian President Gamal Abdel Nasser nationalised the Suez Canal Company. Britain and France decided to regain control by force and agreed on a joint operation with Israel. Israel had its own reasons for fighting Egypt, including the blockade of maritime routes and cross-border attacks. France had another concern: the Algerian War. Nasser supported Algeria's independence movement, while Israel could divert Egyptian forces. [32]

On 29 October, Israeli troops began their advance into Sinai. Britain and France issued an ultimatum to both sides, then intervened under the pretext of protecting the canal. Israel occupied almost all of Sinai; for London and Paris, the operation became a political defeat. The United States demanded an end to the war, and the Soviet Union also exerted pressure. In messages dated 5 November, Soviet Prime Minister Nikolai Bulganin threatened Britain and France with missile attacks; Israel was warned of consequences that could call its very existence into question. The war had to stop, and the troops subsequently had to withdraw. [32, 34]

Against this background, Israeli representatives held a secret meeting on 7 November 1956 with French ministers Christian Pineau and Maurice Bourgès-Maunoury, both former Resistance members. The preliminary understanding about a peaceful research reactor was broadened: assistance with creating a nuclear deterrent was now on the table. After several months of negotiations, agreements on the reactor and plutonium separation technology were formalised in October 1957. The future Dimona complex began with this project. [11, 13]

The reactor was to use heavy water, initially with a thermal output of 18 megawatts; the official figure later rose to 24. Heavy water acts as a neutron moderator, allowing such a reactor to run on natural uranium. This avoided the need for a gigantic enrichment plant like America's K-25. Extracting plutonium from irradiated uranium fuel elements, however, also required a reprocessing plant. French assistance covered both parts of the complex. [11, 13]

And the power output? The documents say 18, then 24 megawatts. Later estimates put it at around 120. Specialists drew attention to the cooling system and other equipment, which could support operation at substantially higher power than the announced figure. These are estimates, not a published operating report from Dimona. [5, 11, 13]



The Dimona nuclear research centre. The reactor dome is visible in the photograph. The underground reprocessing facilities form a separate part of the complex. Photograph published by the National Security Archive.

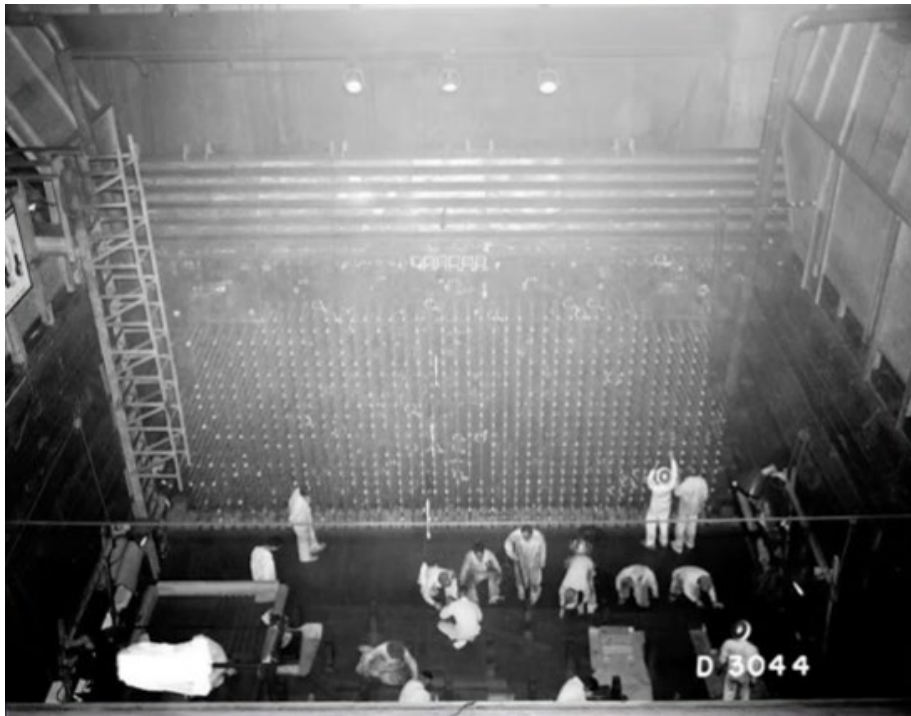
Construction was surrounded by cover stories. The most famous was the ‘textile factory’. In September 1960, the American ambassador, Ogden Reid, flew over the area with Israeli officials and asked about the construction site. Addy Cohen, a finance official accompanying him, replied that it was a textile plant. He later explained that a textile factory really was being built nearby, and that he had improvised the answer. [13]

By late 1960, concealing the reactor itself was no longer possible. Israeli Prime Minister David Ben-Gurion announced that a peaceful research centre was being built at Dimona. The Americans wanted to inspect this peaceful centre. In 1963, President John F. Kennedy persistently demanded regular visits, and American specialists did indeed come. Inspecting a reactor and learning everything about a secret production facility, however, are different things. [14–15]

Dimona never came under international safeguards. Israel did not join the Treaty on the Non-Proliferation of Nuclear Weapons, and the complex is not subject to safeguards administered by the International Atomic Energy Agency, or IAEA. Here, ‘safeguards’ means inspections and accounting for nuclear material intended to detect its diversion to military purposes. Israel’s other research reactor, at Soreq, is under IAEA safeguards. [16]

A Reactor Does Not Yet Mean a Bomb

To picture the scale of the Dimona project, recall [‘The Magic Wand Inside the Atomic Bomb’](#). The American reactor at Hanford that produced plutonium for Trinity and Fat Man began operating in 1944. Its initial power was 250 megawatts. An enormous graphite block, 2,004 channels, and cooling water from the Columbia River. [17]



The front face of Hanford's B Reactor, with its rows of process tubes. Hanford produced plutonium for Trinity and Fat Man.

Taking the higher estimate for Dimona gives roughly half the American reactor's original power. But do not rush to halve its plutonium output. The relationship is not that simple: much depends on the operating regime and the specifications for the material being produced.

Accounts differ on when plutonium separation began at Dimona, placing it in late 1965 or 1966. By May 1967, on the eve of the Six-Day War, participants' accounts indicate that Israel's nuclear programme had reached the point at which the first nuclear explosive devices could be assembled. [11, 18]

Meanwhile, France was changing course. Charles de Gaulle returned to power in 1958, and the earlier agreements began to run into obstacles. The Algerian War ended in 1962. Israel's value to Paris as a counterweight to Egypt diminished. Nevertheless, despite delays and interruptions, construction at Dimona was completed.

The question of testing did not disappear, however. Reports of underground explosions in the Negev in 1963 and 1966 appeared in the press. They never became confirmed facts. Israel had access to French test data; whether it conducted tests of its own is a separate question. [11]

Samson: The Temple Left Standing

Now Yitzhak Ya'akov enters our story: an Israeli military engineer who later became a brigadier general. Born in Tel Aviv in 1926, he fought in the War of Independence, graduated from the Technion, the technical university in Haifa, and then studied at the Massachusetts Institute of

Technology. His entire career concerned scientific research and the technological capabilities of the Israeli armed forces. [18]



Yitzhak Ya'akov, a military engineer who helped prepare a contingency plan for a nuclear demonstration in 1967.

In 1999, thirty-two years after the events, Ya'akov told the historian Avner Cohen about the top-secret Operation Shimshon - Samson. A recording of these recollections was later published by the Wilson Center, an American research institution. [18–19]

To understand the name, recall the biblical Samson. His strength was extraordinary: he tore a lion apart with his bare hands and took on the Philistines, his people's enemies, single-handed. Then a woman appeared: Delilah, with whom he fell in love. The Philistine rulers offered her money to discover the secret of his strength. Samson resisted for a long time but eventually gave in: his hair had never been cut since birth and cutting it would make him an ordinary man. One day, as Samson slept with his head in her lap, Delilah summoned a man who cut off his hair. His strength vanished. The Philistines seized him, put out his eyes, and threw him into prison.

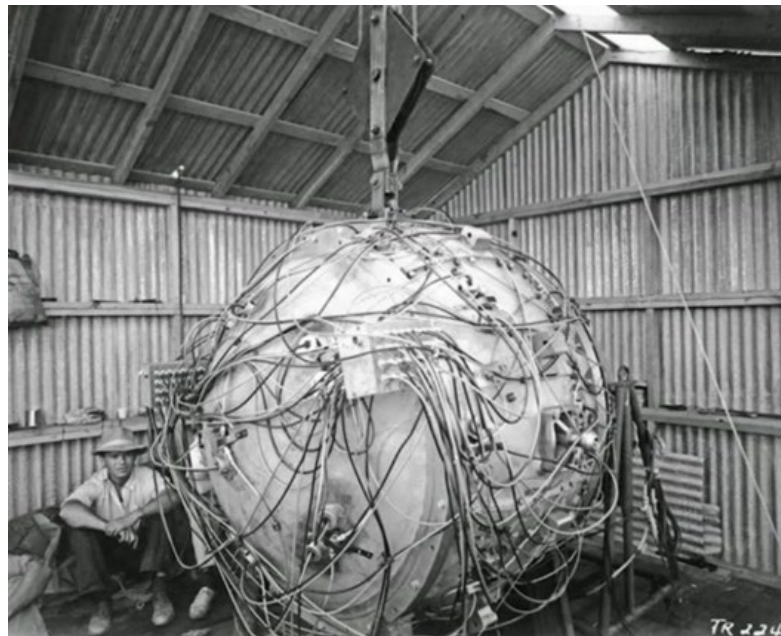
But his hair gradually grew back. When his enemies gathered for a celebration and brought out their captive to mock him, he grasped the pillars supporting the building and brought it down. He died himself, but the celebrating victors did not get away either. That was the story chosen to name a top-secret military operation.



Two familiar images of Samson: the fountain depicting him tearing open a lion's jaws at Peterhof, and the collapse of the temple. The second scene matters for our nuclear story.

In the spring of 1967, Egypt concentrated major forces in Sinai, demanded the withdrawal of UN peacekeepers, and closed the Straits of Tiran to Israeli shipping. War was approaching. According to Ya'akov's recollections, he helped prepare Samson in the weeks before the war and visited Dimona. There he saw a strange contraption resembling an octopus tangled in wires.

We have seen something similar in photographs of the first American devices. Here, however, the task was not to run an experiment at a domestic test site, but to decide what to do in the event of a military catastrophe. Israel did not yet have a deliverable nuclear bomb.



The American experimental device, the Gadget, before the Trinity test in July 1945. This illustrates an early nuclear device; it is not a photograph of an Israeli bomb.

The plan was unusual: fly the device and specialists by helicopter to a mountaintop in eastern Sinai and conduct a demonstration explosion if Israel's situation became catastrophic. The intended effect

was primarily psychological. Show the enemy that the war might take a turn very different from the one it had expected. [19]

It never came to that. The Six-Day War began on 5 June 1967. Israeli aircraft smashed most of Egypt's air force on its airfields, then carried out effective strikes on airfields in Syria and Jordan. The situation quickly turned in Israel's favour, and a demonstration explosion was no longer needed. Even Ya'akov's later suggestion that a test should be conducted anyway was rejected. [19]

Telling the story of the old operation earned Ya'akov a criminal prosecution. He was arrested in 2001: he had given interviews and written memoirs, distributing a few copies to acquaintances. The print run was eighteen copies, but even that was enough. The court rejected the charge of deliberately passing information to harm national security, but disclosure of a secret still earned him a two-year suspended sentence. He died in 2013, aged 87. [18]

From Aircraft to Missiles: Marcel Dassault

Six years passed between 1967 and 1973. The devices could have become considerably more sophisticated in that time. The next question now demanded an answer: how was the nuclear device to be delivered? No longer for a demonstration on a mountain, but for use in combat.

Here the French appear again. And once again, a man whose name is familiar to anyone interested in aviation: Marcel Dassault.



Marcel Dassault, the French aircraft designer and industrialist. His company developed not only Mirage aircraft, but also the MD 620 missile for Israel.

He was born Marcel Bloch in 1892. During the First World War, he helped develop aviation technology, then built his own industrial career. Under German occupation, he refused to cooperate, was imprisoned by the Vichy regime, and passed through Drancy and Buchenwald. After the war, he

returned to work despite paralysis following diphtheria, which affected him from 1945 to 1953. He adopted the name Dassault from the Resistance alias of his brother, General Paul Bloch. [20]



Israeli Air Force Mirage III fighters. The photograph was taken before June 1967 and published in an Israeli Air Force publication. Source: Wikimedia Commons. [33]

In 1957, Dassault Aviation opened a missile division in Saint-Cloud. It was not entering rocket technology from a standing start: the Mirage III had a variant with an additional liquid-fuel rocket engine. In 1962, at the French government's request, work began on a ballistic missile for Israel. Its French designation was MD 620; its Israeli name was Jericho. The company's official website documents the project's history. [21]

Fraud prevention: fake Dassault Aviation investments

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MD 620 JERICHO

HOMEPASSIONAIRCRAFTMILITARY DASSAULT AIRCRAFTMD 620 JERICHO

ORIGINS AND PROTOTYPES

THE BALLISTIC MISSILE

Efforts to expand its lines of business led the company to look into the missiles its aircraft could carry and, on September 15, 1957, to open Missile department in Saint Cloud. In 1962, the French government approached Dassault to develop a ballistic missile on behalf of the State of Israel. That sparked work on the MD 620 Jéricho. The MD 620 needed to transport a warhead over 500 km.



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A contract worth approximately \$100 million was signed in April 1963. Let us not spend time converting that into today's prices; there is a more revealing comparison. A Mirage III then cost about \$2 million. The same money could have bought another fifty excellent fighters. For tiny Israel, that was a great deal.

But the money went on missiles. The French were to develop the system, build prototypes, conduct tests, and, most importantly, transfer the manufacturing technology. Not simply deliver a few finished products but enable Israel to make them itself. [11, 21]



The MD 620 on its launcher. The missile project required the aircraft company to master a new field of engineering.

On 1 February 1965, a single-stage test version was launched from Île du Levant in the Mediterranean. A two-stage version was successfully tested in March 1966. It was the first French ballistic missile with an onboard digital computer. The missile programme gave the company experience in flight control and inertial guidance at speeds of up to Mach 6. Serious engineering for the mid-1960s. [21]

France's comprehensive arms embargo against Israel halted the French programme in January 1969. Israel continued developing its missiles independently at home.

Five Hundred Kilometres Matter

The MD 620's stated mission was to deliver a warhead over a distance of 500 kilometres. For the Soviet Union or the United States, that range did not make it an intercontinental weapon. For Israel, it had to be assessed on an entirely different map.



An illustrative circle with a radius of approximately 500 kilometres, centred in central Israel. It shows the regional scale, not specific targets or launch positions.

On that map, the meaning of five hundred kilometres is immediately apparent. A launch from central Israel could put Cairo and Damascus within reach. For a Middle Eastern confrontation, this was a very significant range.

Two solid-propellant stages, a separating warhead, and a launch mass of about 6.7 tonnes. A compact ballistic missile, and a sophisticated one for the mid-1960s. The French aircraft company had produced something worth examining more closely. [22]



An MD 620 in a production facility. Developing the missile involved propulsion, guidance, testing, and setting up manufacture.

We are particularly interested in the nose. Long and narrow. The Fat Man of 1945 would never fit in there. A nuclear warhead for that missile would have to be far more compact than the first-generation bombs.



The missile's nose section is highlighted in the photograph. This is where the missile programme meets the history of nuclear warhead miniaturisation.

Why This Is No Longer Fat Man

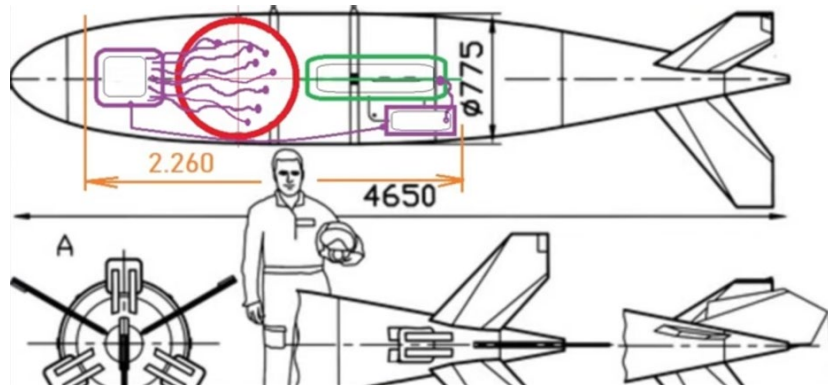
In '[How Fat Man Lost Three Tons](#)', we traced the shrinking dimensions and mass of nuclear weapons. Here we can see exactly why that mattered: the warhead has to fit into the missile's nose section.

For comparison, consider the American Mark 7. Production began in 1952. This was a weapon that tactical aircraft could carry, rather than only heavy bombers. In the photograph of the museum exhibit, the contrast with Fat Man's bulky casing is obvious. [23]



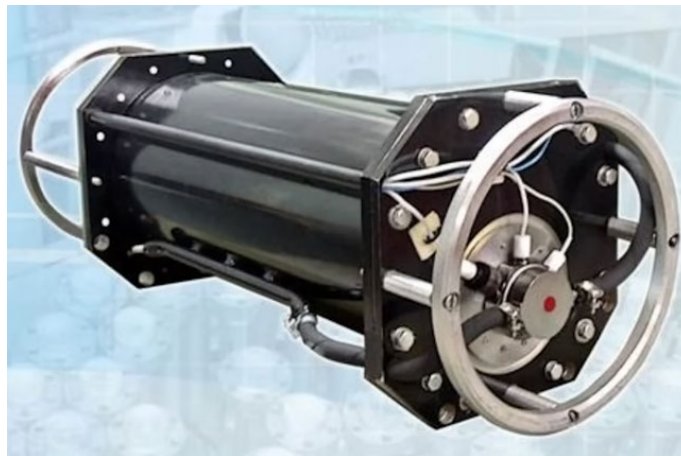
An American Mark 7 nuclear bomb on display in a museum.

We do not know the internal design of the Israeli warhead. But the American Mark 7 shows that the necessary degree of compactness had been achieved back in the 1950s. For Israel in the early 1970s, this would already have represented a substantial technical achievement.



A diagram of the American Mark 7 bomb for comparing dimensions.

In earlier articles, we saw how not only the bomb's dimensions but also its specialised equipment changed. One example is the pulsed neutron source shown in the next illustration.



A pulsed neutron source, an example of the specialized equipment developed as nuclear technology advanced.

We have dealt with the engineering. Now let us see what role this last argument might have played in the war of 1973.

October 1973

The Judgement Day War began on 6 October 1973. On Yom Kippur, one of Israel's most important religious holidays, Egypt and Syria launched a coordinated offensive. Egyptian troops crossed the Suez Canal and breached the Bar-Lev Line, the system of Israeli fortifications along its eastern bank. Syrian armoured forces attacked on the Golan Heights. Israel was caught off guard and had to rush its reservists into action.

In the previous war, air power had brought Israel a swift victory. Now Egyptian forces operated under the protection of air defenses built with Soviet assistance. Attacking the advancing troops from the air became far more difficult. An attempted Israeli counterattack in the south on 8 October ended in a serious defeat. Defense Minister Moshe Dayan took the crisis extremely hard; accounts from the time reveal fears for the state's very survival. [24]

According to a report in Time magazine dated 12 April 1976, Israel hurriedly prepared thirteen atomic bombs in the first days of the war. Later, in The Samson Option, Seymour Hersh linked the nuclear preparations to an attempt to secure urgent American military assistance. The exact scale of those preparations, and whether they were intended to pressure Washington, remain disputed. [24]

If we accept that interpretation, the meaning of these actions was brutally clear: if we have to go, we will not go alone.

No publicly available order confirms these details. The story became known through newspaper reports and books whose accounts differ. Thirteen bombs therefore cannot confidently be turned into thirteen nuclear missiles on their launch pads. [24]

There are objections to this interpretation, too. In a 2013 study, the American research organisation CNA, the Center for Naval Analyses, concluded that nuclear readiness measures were probably taken, but that the evidence for deliberate pressure on the United States was insufficient. According to the later testimony of an aide to Minister Yisrael Galili, on 7 October Dayan proposed authorising preparations for a possible demonstration of Israel's nuclear capabilities. Galili and Deputy Prime Minister Yigal Allon opposed it, regarding the step as premature. Golda Meir rejected the proposal. [24]

But the crisis became so serious that the nuclear question arose on more than just the Israeli side.



Richard Nixon, Henry Kissinger, and Golda Meir in the Oval Office in 1969. Source: NARA, published by the National Security Archive.

Washington had been discussing Israel's nuclear programme long before this war. Following Nixon's meeting with Meir in September 1969, a tacit understanding began to take shape: Israel would not announce the bomb or conduct a public test, and the United States would ease its pressure on the nuclear issue. No complete record of the conversation exists; the policy shift can be traced through subsequent documents. [1]

In the second half of October, reports emerged about the Soviet ship *Mezhdurechensk*, which might have brought nuclear weapons to Egypt, and about warheads for the Scud missiles deployed there. A declassified American assessment dated 30 October did not, however, confirm the delivery of nuclear weapons. There were reports, but no conclusive confirmation. [25]

On 6 December 1973, the question was raised in Britain's House of Lords as well: had the Soviet Union really delivered nuclear warheads for Scud missiles to Egypt? The government replied that it had no confirmation. The alarming reports existed; a definite answer did not. [26]

By late October, the situation on the Egyptian front had reversed. Israeli troops had themselves crossed the Suez Canal to the western bank and cut the Egyptian Third Army's supply routes. Its units, which had attacked on the southern sector at the beginning of the war, were now blockaded on the eastern bank near the city of Suez. On 22 October, the UN Security Council adopted Resolution 338, demanding a ceasefire. Egypt and Israel agreed, but the fighting continued as Israeli troops completed the encirclement. The Egyptian force now faced destruction. It was against this background that the confrontation between Moscow and Washington intensified.

Leonid Brezhnev, general secretary of the Communist Party of the Soviet Union, proposed joint Soviet-American intervention and warned that, if the United States refused, the Soviet Union might act alone. [27–28]

The American alert, by contrast, is a documented fact. During the night of 24–25 October 1973, the US armed forces were placed on DEFCON 3, a heightened level of defence readiness.

Henry Kissinger, serving simultaneously as secretary of state and the president's national security adviser, discussed the risk of direct Soviet intervention with the military leadership. Admiral Thomas Moorer, chairman of the Joint Chiefs of Staff, transmitted the order. American nuclear forces became part of the signal to Moscow.

On 25 October, the UN Security Council adopted Resolution 340. It again demanded a ceasefire, a return to the positions held when the original ceasefire took effect, and the deployment of international forces to monitor compliance. The crisis began to ease. There was no direct clash between the Soviet Union and the United States. A regional war had come close to taking the superpowers' confrontation to an entirely different level. [35]

The Last Argument

What role did Israel's bomb play in all this? There is no yardstick for measuring its influence on Nixon's or Brezhnev's decisions. We cannot confidently claim that it secured American assistance or prevented Soviet intervention. Yet its existence can no longer be reduced to a technical achievement alone. Behind the reactor, the plutonium, the bombs, and the missiles stood a clear political message: if an enemy raised the question of destroying Israel, the consequences could extend far beyond Israeli territory. [24]

This weapon did not promise to save the country under every possible scenario. It was meant to make the country's destruction unacceptably costly for anyone prepared to take the war that far. That was the threshold for which the last argument was intended.

The bomb does not exist. The last argument does.

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