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Interview with Bertrand Goldschmidt by Avner Cohen

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Summary:

Transcript of Avner Cohen's 1993 interview with Dr. Bertrand Goldschmidt. Goldschmidt was a leading French nuclear scientist who helped develop the PUREX plutonium extraction technique. In this interview, Goldschmidt explains the background of the French role in constructing the Dimona nuclear facility.

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Interview with Bertrand Goldschmidt^[1]

This interview was conducted on 15 June 1993

Interviewer: Dr. Avner Cohen

Bertrand Goldschmidt: Think of buying . . . it wouldn't have cost them very much, the heavy water^{[2][3]} produced in Norway. And if we, you see we hid during the war, as it said in that book, those 8 tons of uranium that the Belgians had loaned to Collège de France and by the way, that we never paid and kept. Without the Norwegian heavy water, which was available—we were able to have the first tons produced in Norway after the war—our whole program would have been delayed by three years. And I believe that if the Commissariat [a l'Energie Atomique]^[4] had loaned its first reactor, let's say in '52 or '53, we wouldn't have got[ten] the first 5 year plan, which was the plan which allowed us to produce military amounts of plutonium. And when the reactor was discussed I believe the Commissariat in France in general if you want to, more of the same thing, would have been strong enough to oppose the partisans of strong integration of Europe, which felt that because, and that was the theory of Jean Monnet,^[5] because Germany had been obliged to renounce the bomb, we should renounce also. You see that was the, if you want the decision to make a bomb was taken, it was really the fight in-between those who felt that France, whatever happened in Europe, could be different from Germany, and the other ones who felt that, to the reasoning of Monnet, that if one wanted a strong Europe, one couldn't have a discrimination between France and Germany. The Russians never wanted Germany to have a bomb therefore France would renounce. That is what I wanted to tell you. But it's nothing . . .

Dr. Avner Cohen: It's an interesting contingency of history. If history were to be a little bit different . . .

Goldschmidt: Yes!

Cohen: Everything could be very radically different.

Goldschmidt: Now, go ahead . . .

Cohen: Let me ask you, I would like to ask you many questions about the Israeli- French cooperation.

Goldschmidt: Well, you know I can't say much more than what has been said, it's very difficult. I don't . . . have you seen the Israelis, are they ready to speak to you?

Cohen: To some extent, to some extent. I know people who are here.

Goldschmidt: Have you read the book [*Les deux bombes*] of [Pierre] Péan?^[6]

Cohen: Of course.

Goldschmidt: You have? By . . . it's 95 percent correct.

Cohen: And I want . . . that's part of what I would like to ask you. Also, there is the biography of Shimon Peres . . .^[7]

Goldschmidt: I have never read it.

Cohen: . . . Which I have here and I'd like to ask you a couple of questions about that. And also there are questions which Mr. Seymour Hersh is quoting you . . .

Goldschmidt: Yes, Seymour Hersh has done a very bad book.^[8]

Cohen: [Excised]

Goldschmidt: First of all, he said would send me . . . he wouldn't speak of me without showing me what he said. He didn't do it, and first of all he, it's all . . . full of mistakes.

Cohen: That's why I'd like to ask you questions.

Goldschmidt: I mean he's not; he's not a serious journalist.

Cohen: He's . . . [was he] making something up?

Goldschmidt: I mean, I was like impressed by him when he came to see me. He said he had the Pulitzer Prize and all that [unintelligible] and he was very serious and finally I found that all extremely . . .

Cohen: Because I . . .

Goldschmidt: He's done it too quickly and, and did it have a certain publicity . . . certain success, his book in America?

[Personal Conversation Excised]

Cohen: But he [Seymour Hersh] quotes you and I'd like to ask you some questions about that, but I'd like to go a little bit systematic[ly] and I would like to divide my questions to periods historically. And I'd like to begin with the questions about the periods before roughly between '51 and September '56; until September 21, '56. Now it has been said in many ways that the Israeli-French nuclear ties actually had preceded the political ties, the political-military ties. And what I would like to ask you about that, I mean people talk about the Dostrovsky^[9] invention and the recent quotation from you in Seymour Hersh, and probably it's inaccurate but I can quote you: "Back when the French bought it, you didn't know what it is, but the French bought one hundred . . ."

Goldschmidt: That's something else; yeah, I will tell you exactly what happened there.

Cohen: So there is the phosphate, the heavy water, and then the connection between some individuals, you see [Francis] Perrin,^[10] and others. So I would like to hear some of your thoughts about that kind of history and how much is proceeded before actually Guy Mollet^[11] felt that he had this debt to Israel.

Goldschmidt: The first thing is the heavy water thing. It wasn't in my domain, if you want, I wasn't involved in it. We were very long, this was one of the weakness I would say of the French Commissariat, we didn't succeed before a long time to have a proper national production of heavy water and then when we did it finally we stopped because we could still get it from Norway for any purposes, even for our fission making reactors. So, but because of the early, in the early days . . .

[Gap in Tape]

Goldschmidt: And I don't know why, technically, there was a rather limited, purely scientific collaboration in-between the people working on heavy water in Howell, the people working on heavy water in France and the CA [interference on tape]. [unclear name] and his nephew by marriage, [unclear name] and [Israel] Dostrovsky, who at that time, I don't even know, he must have been at the Weizmann Institute.^[12] I don't think, I don't even know if he was at the, at the . . .

[Gap in Tape]

Goldschmidt: At the [Israeli Atomic Energy] Commission, I don't even know if the Commission even existed then.

Cohen: The commission existed [was founded] in '52 and Bergmann ^[13] did not like so much Israel Dostrovsky, it was personality . . .

Goldschmidt: In any case, I think this started much before.

Cohen: That's right.

Goldschmidt: Now, how did we know the Israelis? There was a . . . different reasons. One of them, I was in charge for instance, of the building of our first uranium plant at the Busché, it doesn't exist anymore--it's giving headaches because there's radioactive waste around in the pond or in the lake. In any case, this plant was built by a French private concern called Associés de Terroir which doesn't exist anymore. And the chairman of that, top man of that firm was called Blumenfeld, and he was a brother-in-law of Weizmann.^[14]

Cohen: Chaim.

Goldschmidt: Of the first president, so that was a link. And probably because of that, we saw others who . . . Bergmann, Bergmann was one of the people who came to visit us.

Cohen: '49, '50?

Goldschmidt: I couldn't tell you. Really, I couldn't tell you, and I know I . . . I knew him. So now let's go to the . . . and probably he knew Perrin because of that also, you see it was [unclear name] who, Bergmann was considered a very good organic chemistry in Germany. Now, I was present at the famous meeting of the two, meeting, they have no relation. Sometime in--I don't even know the date, perhaps it's probably '52 or '53--I don't remember. Bergmann came, it must be '53, I would say. [He] came to see [Pierre] Guillaumat.^[15] Guillaumat was a strange man.

Cohen: [Chuckles]

Goldschmidt: I mean, I am speaking very frankly with you. But that is not to be quoted.

Cohen: Okay.

Goldschmidt: Guillaumat was born in an anti-Semitic family. He didn't hide it. He was my brother at school and never very nice, he was my brother. My brother knew he was anti-Semitic, and slowly by intelligence I would say, because he was a very intelligent man, he become conscious of that, and I think he would . . . in any case, he became very pro-Israeli. You see he, it's sometimes happens that some anti-Semitic people are very pro-Israeli. He was very, he had a great admiration of the Israelis. And one day he asked me to come, he said this Bergmann who comes is going to offer us something. So I came and here was Bergmann saying that his people had found a new method to treat low-grade ores and in those days we had mainly low-grade ores to process, that we were finding low grade ores in France. And it was a time where we he hadn't yet decided which would be the private industry, which would be responsible of the ore processing in France. Up till then we were doing it ourselves at the small factory at La Buché. And so Bergmann says, "It's a funny thing I am offering you, our men have found a new method, quite efficient for low-grade ores, we want to make—we need money, we'd like to sell it to you and what is your reaction?" And so I remember discussing a little bit with Guillaumat. Guillaumat told me, and that has always been his point of view. So [speaking in French]—they are serious people. So I am not quite sure the figures. I think it was in such large sum, he wanted hundred million francs.

Cohen: Hundred million francs?

Goldschmidt: Of the old, the old francs, and we bargained. And then it turned out that we, I think we agreed on sixty million and then the next day we got five or six books explaining the method of ion exchange and all the rest. And it was more or less at that time that we chose, we chose

[unclear name] to build our first ore processing plant and we just passed them the books, they were very happy to use it. It wasn't so important because it must have been about a year, I would say about '53 or '54, by the time they started working on it, because in '55 the Americans published the same thing.

Cohen: That's right.

Goldschmidt: You see it had been done . . .

Cohen: Atoms for Peace?^[16]

Goldschmidt: Atoms for Peace at Geneva. So, I mean it was a secret that wasn't . . .

Cohen: That secret.

Goldschmidt: Kept so long.

Cohen: Yeah, Seymour Hersh quotes you about that.

Goldschmidt: So, it is, that's exactly what happened. Nothing, it was completely over the board, nothing secret, nothing governmental. Guillaumat was totally powerful enough and had enough, it was the days when the Commissariat had more money than it could spend . . .

Therese Delpech:^[17] Good old days.

Goldschmidt: Good old days. And all that was decided without any problems.

Cohen: What happens after that? We get to '54, and apparently Ben-Gurion, ^[18] when come back to power in '55, he already began with the first elements of the project.

Goldschmidt: That I don't know. You see . . . [Laughs] I can, I have mentioned it, not in that book but in the other one. In '54, I was invited with my wife by Bergmann to make a tour in Israel; I even gave a talk . . . on what? Probably, my usual talk at that time was chemistry and atomic energy, where I spoke of plutonium, uranium and everything. And we had a very nice stay in Israel; that was in '54, he received us beautifully. We arrived, we had a whole night, the whole trip took the whole night for some silly reason of plane trouble and we were very tired and they had done us an extreme favor. We were invited to a premier of a play and imagine it was *[The] Caine Mutiny [Court Martial]*^[19] in Hebrew, I didn't know a word of Hebrew, and it's a play where it's all talking, *[The] Caine Mutiny [Court Martial]*. So I remember that. Now during that trip I went to see Ben-Gurion, I was taken to see Ben-Gurion in the kibbutz in Sde Boker.^[20]

Cohen: Who took you, Bergmann?

Goldschmidt: What? Bergmann took me.

Cohen: And Peres, or just Bergmann?

Goldschmidt: No, no, Peres I didn't know. Bergmann took me; I think there was [sic] two couples. In any case, Bergmann, so we had a talk, and during that time my wife was in, was . . . Mrs. Ben-Gurion, and then Bergmann said to me, "When will atomic energy be able to, to transform the Negev . . ." ^[21]

Cohen: Negev installation.

Goldschmidt: And make a . . .

Cohen: Blooming.

Goldschmidt: Blooming Negev. I don't know, fifteen years, not before. Oh, it's ridiculous! He got very cross, [saying that] if you Jews came and worked in Israel, it'd be much shorter. I said perhaps [it would take] twelve years. And then we left and we joined the ladies and so he said to my wife who doesn't — who can't lie, he said "so Mrs. Goldschmidt when are you coming to settle in Israel?" Naomi, who's English, got puce in the face and said, "It's a lovely country Mr. President." [He responded,] "Ah, so you don't want to come." He turned his back and he didn't say goodbye and we didn't see him anymore. He wasn't an easy man. So '63, that was the last time I went to Israel and he was prime minister then, and I went to see him, and he was little bit ill, he had the flu, and that was when he had relations, I think he wanted . . . I don't remember what it was but already the relation was slowing down and... I told him, "You see already, nine years have passed and I can't tell you even that in ten years the Negev will be transformed by atomic energy." Now, so I have the impression that we had, if you want . . . For the atmosphere we had good scientific, friendly relations, you see, and nothing really political before '56.

Cohen: But in '55 you and France begin slowly making this division of new military applications and general studies and all that.

Goldschmidt: Well, that's nothing to do with the design.

Cohen: Nothing.

Goldschmidt: Nothing. I mean we had enough problems to decide things in France that we weren't going to mix up anybody with that.

Cohen: Did you know, did you know that at that time there was the very beginning of organizational effort in Israel, I think it was '55 . . .

Goldschmidt: I had no idea.

Cohen: There was no sense of . . .

Goldschmidt: Because Dostrovsky, the man who succeeded Bergmann? No. Only was only much later.

Cohen: Much later, [in] '66.

Goldschmidt: I don't remember very well. In any case, to go to the only thing I can tell you with precision because I was there, it was the 13th of September '56, so that was [a] rather big meeting where Bergmann came with Shimon Peres.

Cohen: It must have been [the] 17th, according to Pierre Péan it was [the] 17th. [What was on the] 13th?

Goldschmidt: 13th was...

Cohen: What has [Who was at] the meeting?

Goldschmidt: The meeting was, that was more or less said it in those books and everywhere. There was Perrin, Guillaumat, and myself and probably a few others of the Commissariat and Peres who was at that time . . .

Cohen: General director of [the] Ministry of Defense.

Goldschmidt: Was he vice minister?

Cohen: Later. At that time he was director general.

Goldschmidt: You'd know better, you see. Because Ben-Gurion was *the* minister of defense but really . . .

Cohen: And prime minister.

Goldschmidt: And prime minister, so the man under him was Peres. And then they explained to us that they wanted our help to . . .

[Gap in Tape]

Goldschmidt: I don't know the word used, because I don't think, one didn't use the word, one didn't use the word "capacity," but something like nuclear capacity and then they added that the day the Americans will see that we have, we are going towards a kind of independence in the field of nuclear energy, there will, they give us . . . they will probably give us the guarantee of existence. They have never accepted to give us up to now. That was really what they said.

Cohen: So when they said "nuclear capability," what was your understanding of what that meant?

Goldschmidt: No, I understood they wanted to be . . . don't forget we didn't know how to make a bomb at that time, you must see, you must see that atmosphere of those days, where making a bomb was considered so difficult by some people in various countries. Even in France, the army, a fraction of the army, was against it because they thought we would never be able and it would cost us too much. So it's impossible to say that we were helping them to make a bomb, we didn't know how to make one ourselves. We were just starting to have a military division and it was, I mean the seeds of our, now surely our factory was producing, was going to produce plutonium. We were building the plutonium producing factors, but all of that was very . . .

Cohen: Beginning.

Goldschmidt: Beginning, and that's where, that's the only, don't quote me for that, but only to tell you what we . . . it was rather obvious because Guillaumat, who was . . . Perrin was agreeing on that, "Oh yes, we'll help you," [but] he [Guillaumat] was shaking his head. At one moment Guillaumat gave me [unclear] and said "le salaud" in French, the bastard, if you would. He was against the French bomb; he's for the Jewish bomb. It was a very, that I can tell you, that just tell you, obviously they showed that they had at a distance what could have been, ten, fifteen years, we didn't know, a vague idea of having the possibility of getting strong enough to have a bomb. And then what they asked us, now something quite different, you must realize in those days . . . It was, it became clear, that commission . . . It was clear still later that a commission would have its letters of nobility; it really would be respected if it would sell a reactor at [to] another country. And the idea what they are more or less the same reactor. Canada, and with great publicity, announced that it would give [a reactor], because it was through the Colombo Plan, to India. So we were very pleased in a way that French industry could build something in Israel. Guillaumat said the only obvious thing I regret is that we cannot announce it. Because naturally, immediately, the French La Société Alsacienne de Constructions Mécaniques [SACM].^[22] I think which was contacted, but I don't know, that must be very clearly said in Péan. They say, "We are willing, but we absolutely don't want to be blacklisted by the Arabs and we don't want to appear in name and we want this to be quite secret." So it had to be secret.

Cohen: Both sides wanted secrecy, of course.

Goldschmidt: Yes. Both sides wanted secrecy.

Cohen: [because of] Both Arabs and Americans.

Goldschmidt: America weren't [wasn't] in the picture, if you want. Now . . .

Cohen: Now, what reactors we talk about, small or big? There was [the] EL-3, -2, -102 . . . ^[23] I mean there [are] all kinds of number[s]. [Would it be] 1000 kW?

Goldschmidt: Oh, no.

Cohen: 300 kW?

Goldschmidt: No, no.

Cohen: Because people talk about, there was a small reactor, in that meeting in September '56, they talked about small, and when the government-to-government agreement is signed in '57, they moved to the Dimona, to the big one.

Goldschmidt: No, no, no.

Cohen: So how did the idea change from the small . . .

Goldschmidt: I had always the impression that it was always [10 or 20 MW] which could be eventually pushed to more.

Cohen: Because in the beginning, in all the sources, including Péan, including Shimon Peres, himself he said it in the first meeting they agreed to have. . .

Goldschmidt: I don't know. That I don't know.

Cohen: Small reactor, 100 kW.

Goldschmidt: I don't remember.

Cohen: And this was supposed to be very close to Rehovot, and then he worked, and then Peres says, his biographer says he heard from Peres, that the Suez campaign,^[24] the musketeer, put things very closely and Guillaumat. . .

Goldschmidt: You see this. . . I . . . don't remember, if you want at such a distance as forty years, nearly forty years from then. I don't remember. If the decision to build a twenty or thirty or whatever thousand reactor, came not immediately, I don't remember. I don't think it really mattered, because the whole thing was decided, it was, nothing was signed the first day, you see. The whole thing was negotiated and there were the two things, there was the . . . now it's really official, there was the plutonium plant and the . . .

Cohen: Reactor.

Goldschmidt: And the reactor. And all that took, a few months naturally, and naturally in the meantime the Suez had happened. Now I don't know at all, for instance, a question that if I had to do the research you are doing, I don't know if Shimon Peres and Bergmann had come to see Mollet before. You see there was all that preparation of Suez which was, that no one knew about. So I don't know that. Or is it after Suez, there was no doubt that two men in the government, or one man because the other one was behind them, was, it was Mollet and Foreign Minister [Christian] Pineau.^[25] Who were [was] really in favor? They were really in favor.

Cohen: [of nuclear weapons] For France? Or for Israel? Or for both?

Goldschmidt: What do you mean for France?

Cohen: Because Guy Mollet changed his mind in some sense after the Suez campaign.

Goldschmidt: Yes, the Suez campaign was so quickly after that. You see, I don't know. You see things like that probably, there were technical discussions first. I mean, at the speed at which things were decided in those days on a problem like that, the time in-between mid-September [around the] 13th or 17th, has no importance, and end of October is very short. So things were surely not very, you see, I think for something which is secret, I don't think it's interesting enough. You can only have an idea of the whole thing. But what happened in between a week or two or three, how things varied, I don't think has great importance.

Cohen: Let me tell you the story as I understand. I understand that in mid-September there was this meeting that you talked and indeed Perrin supported. It became [a] basic agreement in [on the] 21st of September, that according to Péan, and then it became even firmer agreement October 10th of '56. Now then there was the '56 campaign, the Suez campaign. According to Péan and others, Guy Mollet, when Ben-Gurion has to withdraw from Sinai, felt a lot of guilt and he [Mollet] felt like he owed something to Israel. He said over and over that I owe something to them.

Goldschmidt: I think . . .

Cohen: Péan quoted him. Now Golda Meir ^[26] and Shimon Peres came to France in October, in November. And apparently, according to Péan and others, Shimon Peres presented this notion of retaliation force and Guy Mollet, in principle, agreed.

Goldschmidt: It's possible. I can't tell you it isn't that. For me, all that, I, you see, the documents are secret and I don't want to go and look in them and I am nothing to do anymore in them. But if you want all this, the evolution of this story, it was all kind of steps and things and the end of it was a very complicated story, it's more that I remember than the beginning.

Cohen: We'll come to that in a second.

Goldschmidt: But there is no doubt that, I don't know, I see there must have been some difficulties, some problems because I see Peres coming to see me at home one Sunday morning. What was he asking me? I've forgotten. You see, but there must have been some slowing down, some hesitation. What is quite certain that I can tell you, that from the moment it became . . . you see we have a committee, a top committee, which probably had to be warned. In any case, I was in those days already responsible of [for] external relations, of [for] foreign relations, and from the beginning, from Francois de Rose, ^[27] who was the foreign affairs man in charge of atomic energy relations, he was that since early '56. He had been that even before, [and] then he had gone to Madrid and came back. Francois de Rose was extremely opposed, [and] said, "It was madness, what would the Americans say?" But that I can tell you is no doubt, that and I don't know who else, but probably other people, the political director or whatever, were opposed, but Pineau was entirely in favor and they couldn't do anything about it.

Cohen: And Mollet?

Goldschmidt: Mollet I think was in favor. I think, I've been told Mollet . . . before dying even said that the great, one of the greatest things he did in life was to save Israel.

Cohen: That's right.

Goldschmidt: So, but if you want, what I remember is that I can say it, about the plutonium factory, there was somewhat of a reluctance of Perrin. Perrin would be very favorable in the beginning to help the Israelis start in atomic energy . . . even . . . when he saw it was going to be plutonium factory then he was very hesitant. I used to be in charge in those days, when I was in charge of foreign relations, doesn't exist anymore because things have changed in the Commissariat, the bylaws of the Commissariat say that, said because it's not valid anymore, that

[the] Advisor General and the High Commissioner were jointly and independently the advisors and the representatives of the government in international relations. And if you looked at the word independently, it means that Guillaumat could make an agreement with Israel without Mollet telling Perrin and Perrin could make one with Egypt the next day without telling Guillaumat. So they decided, they agreed upon and that's how I was . . . my first job of what is now this big direction, was to go up and down, two floors to Guillaumat who called me, I've finally written this letter to so and so, get the visa of Perrin. And Perrin had to do the same thing and for days or weeks, I don't know, Perrin couldn't agree, didn't agree on this plutonium factory. I can say that, he's dead now and I said I had to go and see him, I used to talk to Perrin because we were friends since a long time and I said [in French], can't continue, then one day, I don't know, Guillaumat said listen I'm fed up, I want him to decide-yes or no, and he was entering, he had entered his car. He had a very nice private . . .

Cohen: Parking?

Goldschmidt: House, no. In the near, boulevard near the prime minister's office we, that was the headquarters of the Commissariat, and it was in the courtyard, and he was entering his car and I came and said, "Listen, you say I say," [unclear], and he always pretended afterwards that I had extorqué [extorted] I don't know how you say that in English.

Cohen: Forced?

Goldschmidt: Forced him to sign which, I mean he only had not to sign, I mean I didn't sign, he signed. So that, I can tell you but . . . to show you that even inside the Commissariat there was not quite the unanimity for the plutonium factory.

Cohen: As you know part of the story, and Shimon Peres talks about it, in some details around the context but not the content, is that the actual government-to-government deal was signed in the last day of the Bourgès-Maunoury^[28] government. Do you recall that? The last day he signed it was when the government was actually over and Shimon Peres ran to his home with the document just to make him sign.

Goldschmidt: You see I wasn't involved, when things came up at that . . .

Cohen: Level.

Goldschmidt: At that level, I wasn't involved. There was a man called Louie [unclear name] who was very pro-Israeli and in the Bourgès-Maunoury's cabinet. Don't forget that the Bourgès-Maunoury was war minister for Guy Mollet before he became prime minister.

Cohen: That's right.

Goldschmidt: So all that, I don't know. I probably knew, I knew it vaguely, and but . . . I mean I've forgotten so many things, but these things that I, on which I wasn't at all involved, I've completely forgotten.

Cohen: What is the roll of Jules Horowitz?^[29] Pierre Péan talked about him a lot, you and him and the two of you Jewish and especially . . .

Goldschmidt: No, no the man who built the plant, the reactor, is Carle [Davis].

Cohen: Carle [Davis].

Goldschmidt: It's Carle [Davis] who was deputy director general of EDF. I don't know he's been something else now. What is he?

[Delpach and Goldschmidt discuss in French where Carl has worked since the IAEA]

Delpach: Do you know [unclear name] what [unclear name] is?

Cohen: What?

Delpach: Wannu [spelling unknown].

Goldschmidt: It's a man called Carl who built the reactor. You see what happen; now I think how Péan got his information because that's interesting.

Cohen: [laughs] I'm going to see him too.

Goldschmidt: I think, because you see the man who was in charge of building our plutonium factory and probably very involved because . . . you see I never, I never, I was . . . by that time, I wasn't in charge of chemistry anymore, so personally I was never involved in the deal. By the way, the deal was in-between Saint-Gobain^[30]-you see how it was . . .

Cohen: There were two deals, I mean between Saint-Gobain and Israel and between the government of France and the government Israel.

Goldschmidt: Guillaumat who was a very brilliant but rather cynical man said one thing in any case [in French]. I mean he wanted to get . . . you understand French?

Cohen: A little.

Delpach: Who said that?

Goldschmidt: Guillaumat. And we did have a deal where for the know-how, I mean there was a deal for building the reactor and building the plant with the industrial firm but the Commissariat got a large bonus, cash for the knowhow. That was the benefit for the Commissariat.

[Gap in tape]

Cohen: Now . . . according to Hersh and others, Israel at that period also gave things to France in terms of knowhow too, especially about design, you know between '58 and '59 at that time.

Goldschmidt: That, I don't know what happened. There was . . . one or two Israelis or Germans even who came [out].

Cohen: Sahara?

Goldschmidt: No, not Sahara, Saint-Louis [unclear location name] where there was a military establishment. But that I don't know, I mean I cannot tell you things I . . . What I can tell you is that then we saw a lot of them, they used to come and see us. I've forgotten the names of the various people. We had contact . . . there was quite a lot of contact. But rather soon I left, I didn't want to be too involved, because I am . . . especially because not to be accused, because I am personally, I am myself Jewish, and it's really my deputy who was called Jean [unclear name] who followed these things in detail.

Cohen: He is still around?

Goldschmidt: No, no, he died quite a few years ago. He died of a strange disease [mumbling], Legionnaires disease.

Delpach: Oh.

Cohen: And Shalheveth Freirer^[31] was at the embassy? He was . . .

Goldschmidt: We had [unclear name] . . . I remember Nachmias.

Cohen: Nachmias.

Goldschmidt: Nachmias. Who had [laughs], who had something strange. He had two eyes of different colors it was, he wasn't able to look at us [mumbling]. And he had been head of the police, or did he become head of the police afterwards? All these people are . . . Oh, that's so far away. So I'm afraid I'm . . . So you see, it stayed, it stayed very secret in . . . even in the French circles, because that is . . . So I told Hersh and I think he bungled it . . . there is the story of Mr. [Charles] Lucet.^[32] In summer . . . what was it, perhaps '62.

[Gap in Tape]

Goldschmidt: De Gaulle was going to Washington, and few days before, Lucet was political director at the Foreign Ministry called me, he wanted to know all about our relation with Israel. In those days I knew it much better than I knew it now. I used to have a sort of things with the dates and everything and I told him all about it. He was rather upset, he said, but if the Israelis have a bomb can we say we had nothing to do about it. I said, "Monsieur Ministère, not only we took her virginity but we made a payment!" [Laughter] So you would . . . no, no, no the funny thing afterwards, he went to Washington, he was following de Gaulle to Washington where he became, a year later I think, ambassador in Washington. And he, and the big banquet in Washington, he were [sic] sitting beside [John] McCone,^[33] who at that time had left the AEC [Atomic Energy Commission] to become head of the CIA.

Cohen: That's right.

Goldschmidt: So McCone told him, "So, Mr. Minister, I hear you are building a plutonium extraction factory in Israel." And so Lucet got very upset [and says,] "Not at all we're just making a reactor." "Ah so it's like that," said McCone, and turned his back to Lucet and didn't address a word to Lucet for the whole dinner and Lucet was a very sensible soul, he was very upset, he said he was very rude with me. So, what else . . . I can't tell you much else, you know, except, I saw the conversation, I saw the . . .

Cohen: Texts.

Goldschmidt: Texts of the conversation between de Gaulle and Ben-Gurion, which is by the way is an extraordinary thing of a coincidence.

Cohen: June of 1960?

Goldschmidt: The 17th of June 1958.

[Gap in Tape]

Goldschmidt: De Gaulle called a meeting where he killed in the egg, that extraordinary collaboration in-between France, Italy, and Germany that [unclear name] had started, without even warning his prime minister. With [Paolo Emilio] Taviani,^[34] [the] Italian foreign minister, and with Franz Josef Strauss.^[35] And when de Gaulle learned that he was absolutely furious and not only, it had, there had been an agreement signed in October, end of October '57, of which the prime minister in those days, called Félix Gaillard,^[36] only heard of it a few months later. Not even when it was signed. Saying that the free countries, Italy, Germany, and France, would do everything together in armaments, including nuclear armaments. So de Gaulle was furious and stopped it immediately, the 17th of June '58. Now the funny thing is that the 17th of June '60 . . .

Cohen: That's right.

Goldschmidt: That is so exactly two years later. Now, why did he wait so long? I think the main reason, and that I don't know what happened. The main reason is that we, when de Gaulle was nominated, took over in '57- '58, our first, the first minister in charge of atomic energy was Soustelle.

Cohen: Jacques Soustelle.^[37]

Goldschmidt: Jacques Soustelle, and Jacques Soustelle was very pro-Israeli.

Cohen: That's right.

Goldschmidt: So it is probable that, I don't know if it did happen like that, but probably [Soustelle] told [de Gaulle] that was my business [in French], I don't want to do anything about it. It's my business.

Cohen: So de Gaulle knew about it only later, because he was not told.

Goldschmidt: Did de Gaulle knew about it only later, or did he, did he, was he shown the importance or danger of it only later but it is . . . I know that Francois de Rose was still around and I think higher importance in the foreign ministry, still couldn't do anything about it and was still upset, and then it is in '60 that [Maurice] Couve de Murville^[38] finally, who had been foreign minister all the time, so finally told de Gaulle that you must stop the plutonium factory.

Delpach: Which was the position of Francois de Rose at that time?

Goldschmidt: Francois de Rose was always, the CDS [audio unclear, may be referring to the chief of defense staff],^[39] was always hostile to the agreement.

Cohen: Now there's . . .

Goldschmidt: [interrupting] Francois de Rose was . . . I mean he was against any form of proliferation.

Cohen: This was because of Arabs, because of [the] American[s], [or] because of proliferation in general?

Goldschmidt: I would say the three, probably.

Cohen: The three of them, because America knew about it in . . . '59, perhaps.

Goldschmidt: I don't know. I've always wondered what . . . There must have been a deal in between America and Israel. I've always wondered because . . .

Cohen: To be quiet about it in the beginning?

Goldschmidt: Because how did they obtain the design? Never made a test. You see, if you read . . . I've always thought of it because it's not so different [a] period, this famous letter that Kennedy wrote to de Gaulle ten days before the signing of the Partial Test Ban Treaty^[40] in Moscow. Kennedy says to de Gaulle . . .

Cohen: '63.

Goldschmidt: "It's vital that you stop testing in the air, we know that it will be a complication for your program but we can get together to see how we can help you in your program, without you

doing such a test in the air, without doing any atmospheric tests.” Naturally we realized our people could get together, naturally we realized that it would pose many technical and political problems.

Cohen: Legal questions too.

Goldschmidt: What?

Cohen: Legal questions too.

Goldschmidt: Yes, in any case that was vaguely the idea. If, what . . . I mean don't forget it was a time when there was a collaboration in-between the Americans and British on weapons. So . . .

Cohen: Between Americans and British . . .

Goldschmidt: So it wasn't against the McMahon amended law of '58^[41] that something would have been done to help the French. I don't know in what way. But, I, I see very well a similar letter that's pure invention that the mag . . . if you don't test, we see what we can do to help you to be quite sure that what you produce is not dummies and . . . I don't know it's possible. I don't know.

Cohen: Now, about the many rumors that the Israelis were in the Sahara.

Goldschmidt: I don't know anything about that. I wasn't there. I went there only once myself before the bomb. I have no idea. I have no idea, you see, there's no doubt they had good links with Bourgès-Maunoury, but I think all that . . . I think that from the minute de Gaulle was there things like that wouldn't have been possible. That is what I would say if you asked me, but I have no proof.

Cohen: What was the impact on the, of the Suez Campaign on the French thinking, especially of Guy Mollet and their own nuclear program as you see historically.

Goldschmidt: Oh I . . .

Cohen: According to [Mc]George Bundy, this was what made a difference, for Guy Mollet, you wrote in your book.

Goldschmidt: I write in my book, I, you see Guy Mollet was as good a European as one would call them in those days, and was present, I think, even at the famous meeting of the Committee Politique de Europe, that met 18th of January '56 if I am right . . .

Cohen: Yes, that's right.

Goldschmidt: Under the chairmanship of Jean Monnet, and who decided that there at home had to own all the nuclear fuel in the community and be one hundred percent peaceful and therefore it mean to renounce Israel from France and if you read the speech of, you know there was an investiture speech. The prime minister went alone in Parliament to give his speech, he was voted four against, and then after he formed his government . . . and in his speech he says, absolutely, that France is going to renounce. I mean it's absolutely clear. Now the first . . .

Cohen: That's [the] 30th [of] '56?

Goldschmidt: Now, there is no doubt . . . that is the 31st of January '56, his speech. Now, there is no doubt that, in the following months, Bourgès-Maunoury, will . . . have had talked with him saying “I don't agree, we should go, we should try and have at least one bomb and show that we can make one.” Don't forget all of that was a qualitative time. Nobody had even, before de Gaulle came, considered a minute that we would make them in series, everyone though it was going to be . . .

Cohen: Really?

Goldschmidt: Much more expensive than it turned out to be. Finally, it isn't the bombs which are expensive. It is what goes with them, the missiles and . . .

Cohen: Submarines?

Goldschmidt: And all that. So . . . by . . . when something called [unclear reference] was made three months later I think, by that time France was already insisting to get, to keep its freedom in this domain.

Cohen: That's right. That's right.

Goldschmidt: And there is the famous speech in June '46 that...

Cohen: '56.

Goldschmidt: June '56. That before Suez and that, Guy Mollet has already made his 180 degree turn, that he said he has given instructions to the Commissariat to start studying a bomb, but it takes . . .

Cohen: Studying?

Goldschmidt: Yes. Then he takes a commitment that . . . in any case, he said that "we will not explode a bomb before the 1st of January '61," because his parliament voted for that. [He] probably saw himself [as] prime minister for five years which was [laughs] a dream in the days of the Third Republic but he saw himself [being prime minister for] a long time. And he said, "And furthermore, we will not do it without consulting, but consulting just to have their option . . . the word is . . . doesn't mean we would take account of their . . . our partners. See we would have to warn our partners before and consult them."

Cohen: Partners in Europe or in

Goldschmidt: No, in the six, in the six. So by that time, he was ready to go . . . to do the studies but not . . . and then, I think, the minute after Suez his . . . lukewarm leadership, which was due to his European feeling, was transformed in an absolute will that we are nothing against having a bomb. Which has what [unclear name], a couple of years before, had felt also.

Cohen: And the reason for that was?

Goldschmidt: Ah, surely the humiliation of Suez.

Cohen: The humiliation of Suez.

Goldschmidt: It was a terrible humiliation.

Cohen: You think, also, he felt for the same reason, also Israel may do the same? Namely that . . .

Goldschmidt: I have no idea.

Cohen: You don't know

Goldschmidt: I have no idea.

Cohen: So the same principle that French should have it, also hold true for . . .

Goldschmidt: I have no idea. I really can't tell you. I have no idea and . . . you see our relations . .

. so in '60, instructions were given to stop supplying the materials to, to stop the work on the plutonium plant. We, I mean de Gaulle, agreed to finish the reactor and that was all. But then there was a . . .

Cohen: But Paris?

Goldschmidt: Then there was a . . . and that is rather vague in my mind, but we had commitments on uranium you see. All that was a complicated agreement because there was all kinds of uranium, there was uranium which we were lending them and there you couldn't have the plutonium, and there was some, we were selling them and there was all kinds of . . .

Cohen: It was supposed to bring back the uranium before they had a reprocessing plant for . . . that France will reprocess it?

Goldschmidt: There was a first forty tons, which were only loaned uranium, you could put them in the pile, but then they could only use the plutonium, I think we could expect the plutonium but you could only use it for peaceful purposes . . . there was something like that. In any case what, perhaps, something that was known but . . . now I can tell you . . . what happened . . . and then we had a commitment to sell them some for a rather long period.

[Gap in Tape]

Cohen: And de Gaulle decided not.

Goldschmidt: No, no, it never went up to de Gaulle. No, de Gaulle wasn't . . . No, de Gaulle had said no to the plutonium plant before the rest, it wasn't such with details if you want. But what happened was this, that we learnt that behind our back and I don't know when we learnt it, it must be around '64 when we learnt it, that behind our back they were trying to buy uranium in [unintelligible] and there we got very, and there . . . by that time François de Rose had left and it was his deputy, who's dead now, Jacques Machtan, who was . . . by the way François de Rose is still alive you know. I saw him a few days ago. He was ambassador to NATO, and afterwards I will tell you what happened for the [unintelligible] and then I think we will have finished. Yes, so we got there, we got very close . . .

[Gap in Tape]

Goldschmidt: Yes, we got very close and then we decided to discontinue all relations in uranium. I don't know, there was a story of 40 tons and the first 40 tons I think belonged to them and afterwards . . . I don't what, know how it worked. In any case, we had received 20 tons of theirs at home and that we never sent back and . . .

Cohen: You were supposed to send it back reprocessed or . . .

Goldschmidt: No, I think after reprocessing the uranium, no I don't know, we didn't behave very well with them. All that's very vague, but I mean even the uranium part of our contract, we didn't fulfill because of the story of [unintelligible] I tell you all that is vague in my mind.

Cohen: Now . . .

Goldschmidt: But all these political things, which I understand for you are the most interesting thing for you. If I knew them, I knew them by hearsay if you want, at the moment but it's such things that I wasn't personally involved and I haven't, I don't remember.

Cohen: What Israel gave to France, it was not just one direction; apparently it was two directions. I mean apparently there was some assistance that Israel gave to France.

[Gap in Tape]

Goldschmidt: They gave us money. They didn't give us any assistance in the plutonium factory; they didn't give us any assistance.

Cohen: What about in design . . .

Goldschmidt: I mean we were so much more advanced. That Saint-Gobain got some experience, perhaps they decided to do things a little different than they decided the year before for the Marcoule^[42] factory, but that's normal when a firm works for, does a second, duplicates a factory, duplicates a model, for example. No I don't know, I don't think they gave anything of importance to France. Perhaps they . . .

Cohen: Computations . . . for designs? Because France at the time had very little computational capability.

Goldschmidt: But that is not linked to atomic energy, I mean . . . I don't think that in atomic energy we got anything of importance from Israel. I wouldn't say that. I don't think. I never heard that we got things . . .

Delpach: I really don't know . . .

[Tape Side-A ends]

Goldschmidt: '57, '58, but that was stopped by monsieur [Michel Jean-Pierre] Debré^[43] when he became prime minister. So I think . . .

Cohen: When was that?

Goldschmidt: Debré became prime minister on [as part of] the first government of de Gaulle, that was in '58-'59. So . . .

[Gap in Tape]

Goldschmidt: You see, de Gaulle was his own prime minister for six months and then became head of state and then Debré came. There . . . I mean I think what I know, but I . . . and here again I wasn't involved, it's that whatever contacts there was with the militaries was stopped . . . I think when de Gaulle came even.

Cohen: Who were the people in the militaries that had those contacts?

Goldschmidt: [There] was a certain General Lavau, was in charge of scientific research in France. He was a member of our top committee, but all that I think . . .

Cohen: They had their own laboratories?

Goldschmidt: What?

Cohen: They had their own laboratories and their own . . .

Goldschmidt: Oh yeah, there were laboratories [in French], the army had some laboratories.

Cohen: So the commission could in principle not even know if there were some other contacts? That could be true?

Goldschmidt: Yes, there were many, and it couldn't have been many, don't forget that the whole conception of the bomb was made in the Commissariat.

Delpach: We farmed out, perhaps, problems like the detonator or things like that you see, the trigger. I don't think, I really don't think that they . . . if they did I don't know about it and by the time we did a hydrogen bomb, which was the only time when we really need external know-how, we had absolutely no relation with them anymore.

Cohen: This was America[n]?

Goldschmidt: What?

Cohen: This was American help?

Goldschmidt: No, we didn't get any help.

Cohen: Because according to what's his name from Princeton . . . his name . . . I mean he mentioned about the, this US help in terms of thermonuclear between US and France.

Goldschmidt: No . . .

Cohen: [Richard] Ullman. Ullman.^[44]

Goldschmidt: Yes, I know who you mean.

Delpach: But that's different.

Cohen: That's quite true.

Delpach: It's a different problem.

Goldschmidt: You see there was a, at one the relations in-between France and America changed around the time the Americans start getting worried that if ever France had a bomb which exploded by itself, if you want, the relations with America came under the safety of the arms, because that was a common interest for everyone because if a bomb had blown up it would be terrible for atomic energy and for . . . I think that's about the maximum you can now get out of my . . .

Cohen: Let me ask you two specific questions. The reactor that was sold, either in September, I think there was move from one type to another type at the end of the story in '57.

Goldschmidt: Schneider, yeah no it doesn't matter.

Cohen: What is, it was EL-2, EL-3, EL-102, do you know what? Because there is all . . . Péan talked about EL-102, the one that Horowitz was . . .

Goldschmidt: I think they called it EL-102. No, because EL-1 was the first one we made in [Fort de] Châtillon. EL-1. EL-2 and EL-3 were research reactors we made in . . .

Cohen: Saclay?

Goldschmidt: Saclay.

Cohen: Saclay.

Goldschmidt: and EL-4 . . .

Cohen: They were small, EL-2 and 3 in size?

Goldschmidt: Yes, EL . . . EL-2 was 2,000 kW . . .

Cohen: Right.

Goldschmidt: And EL-3 I think 10,000 [kW] we are getting closer to . . . and EL-4 was a power plant made by the EDF in Britain, which had closed down a year, a few years ago. Now I think we used to call EL 102, 1-0-2-, the Israeli one, and there were all kinds of codes. There was something called Amazon, I think that was the reactor project and something called Ballzac for what reason was the plutonium project and that's, that's, all that, but . . . yes that was your first question.

Cohen: The second question was about the role of Jules Horowitz, you don't know?

Goldschmidt: Horowitz was our top man in reactors at that time more or less, in reactor building, in reactor conception but . . .

Cohen: According to Péan, he was very emotionally attached to help to Israel . . .

Goldschmidt: That's quite possible. I can't tell you, I don't know.

Cohen: Did you know the man who has the credit for Dimona, the Israeli one, his name was Manes Pratt.^[45]

Goldschmidt: Yes, we used to see him all the time.

Cohen: What do you recall of him?

Goldschmidt: Nothing really.

Cohen: He was an engineer.

Goldschmidt: He had a bad temper. He was a difficult man, but I think he was a very good, I think he was the man who built all that.

[Excised]

Goldschmidt: He was . . . very difficult, there was always drama with Pratt, that's what I remember.

Cohen: It was what?

Goldschmidt: You have any drama; it was drama with Pratt, that's all.

Cohen: Okay, do you recall, when did you last see Ben-Gurion?

Goldschmidt: I saw him '63, the last time I went to Israel.

Cohen: And did he talk to you directly about the problems with de Gaulle and the Americans, the letters from Kennedy?

Goldschmidt: Surely not. It was a sort of curtsey, oh no, it was a courtesy visit. I don't remember, I was with my daughter. No, I just wanted to be nice with . . . to say thank you and show me Israel . . . Ben-Gurion a second time. Then the second time we were asked not to go to Israel for quite some time by... Especially me, being foreign relations, after . . .

Cohen: The break.

Goldschmidt: After the break.

Cohen: But before that you visited Dimona a few times. You saw Dimona a few . . .

Goldschmidt: No, no.

Cohen: No?

Goldschmidt: No, no, I never went. I have been twice in my life in Israel. The first time was in '54 with my wife, the second time was in '63 with my daughter and at that time they did bring me to Dimona.

Cohen: That's right, because...

Goldschmidt: They did.

Cohen: Hersh quoted you that they brought you to Dimona.

Goldschmidt: They brought me to Dimona but I didn't even ask. And I didn't, I wasn't shown this underground plant. I think very, very few people in France have seen it.

Cohen: Of course the people from Saint-Gobain saw it.

Goldschmidt: Those who were involved in the building, I don't know if they saw it finished. Because don't forget it wasn't finished when the deliveries were stopped and in principle all contact was stopped. How did they; I don't know how they continued.

Cohen: Apparently according to Peres' biography in Hebrew, there was the meeting between de Gaulle and Ben-Gurion in which he said you are a friend, ally . . .

Goldschmidt: He had no . . . It's after the meeting.

Cohen: That's right.

Goldschmidt: It's on the steps . . .

Cohen: That's right.

Goldschmidt: Of the Elysée after having been [unclear] with Ben-Gurion. He said, "Israel mon ami, mon ami," but that's all de Gaulle, who could be sweet and sour at the same time.

Cohen: But Peres and [unintelligible] reveal, [they] reach some understanding or deal that the government to government assistance would stop; however, Saint-Gobain would be allowed to continue because there were contracts and there was money and there was . . . you can't stop it in the middle, so the firm would be allowed . . .

Goldschmidt: If you want, yes, but no deliveries were allowed. I think, from that moment, deliveries were stopped.

Cohen: You mean delivery of uranium?

Goldschmidt: Of material. No equipment. I have always thought that from that moment, deliveries of equipment were stopped.

Cohen: Now, you felt that "external relations" [at the CEA] were all the time in the picture during that time? Sometimes did you get the feeling you don't get the full picture of what is going on?

Goldschmidt: In the Commissariat?

Cohen: Yes.

Goldschmidt: No, it is not our business anymore. We've been involved with the making of the agreements between the Commissariat and Israel. These agreements included these sums of money for the know-how, then afterwards we gave the permission to Saint-Gobain, we took a false name, as I said, took a false name to build a reactor and a plant, from then on it wasn't our problem.

[Personal conversation excised]

Delpach Okay, I think . . .

Cohen: Many thank[s to] you.

Delpach: I think . . .

Cohen: Yes.

Delpach: Mr. Goldschmidt is very busy.

[Tape Ends]

^[1] This transcript has been edited lightly for readability purposes and annotated for convenience. Small sections may have been excised to protect confidential sources and personal information. These excisions are explicitly marked in the text.

^[2] The conversation began before the recording started.

^[3] Heavy water is a form of water consisting almost entirely of molecules containing deuterium, a heavier isotope of hydrogen. Heavy water is used as a neutron moderator in certain kinds of nuclear reactors which can be used to create fissile plutonium.

^[4] Commissariat à l'Énergie Atomique (CAE) is the French governmental organization established to promote the civilian and military use of nuclear technology.

^[5] Jean Monnet (1888–1979) was a French diplomat and political economist. Monnet is widely considered to be the chief architect of European unity.

^[6] Pierre Péan (1936–) is a noted French investigative journalist. He covered the French-Israel nuclear collaboration in his book, *Les Deux Bombes*. Pierre Péan, *Les Deux Bombes*, (Paris: Fayard, 1981).

^[7] Shimon Peres (1923–) was the deputy director general and director general of the Israeli Ministry of Defense in 1952 and from 1953 to 1959, respectively. In 1959, Peres became a member of the Knesset and was subsequently appointed deputy minister of defense, which he served as until 1965. Peres played an instrumental role in the development of Israel's nuclear program, helping to establish the Dimona reactor and securing French aid in the 1950s.

^[8] Seymour M. Hersh, *The Samson Option: Israel's Nuclear Arsenal and American Foreign Policy* (New York: Random House, 1991).

^[9] Israel Dostrovsky (1918–2010) was a notable Israeli scientist. Working at the Weizmann Institute, Dostrovsky founded the department of isotope research and later served as the director general of the Israeli Atomic Energy Commission under Israeli Prime Ministers Levi Eshkol and Golda Meir.

^[10] Francis Perrin (1901–1992) was a French physicist who, with other French researchers, established the possibility of nuclear chain reactions and energy production.

^[11] Guy Mollet (1905–1975) was the Socialist prime minister of France from 1956-1957.

^[12] The Weizmann Institute of Science is an Israeli research institute dedicated to graduate and post-graduate studies in a number of scientific fields including biology, physics, mathematics and chemistry.

^[13] Ernst David Bergmann (1903–1975) was an organic chemist and protégé of Chaim Weizmann who served as a member and later head of the scientific department of the Haganah. Bergmann was also the first chair of the Israeli Atomic Energy Commission (IAEC) from 1952 to 1966. He is widely considered to be the source of scientific inspiration for Israel's nuclear program.

^[14] Chaim Weizmann (1874–1952) was a prominent scientist and Zionist. He founded the Weizmann Institute in 1934 and served as Israel's first president from 1948 to 1952.

^[15] Pierre Guillaumat (1909–1991) was French President Charles de Gaulle's minister of the army from 1958–1960 and minister of education from 1960 to 1961.

^[16] Atoms for Peace was an American program inaugurated by President Eisenhower to spread the peaceful use of nuclear power. To achieve this goal the program provided varying levels of aid, from basic research equipment for schools or hospitals to the construction of working reactors for nations around the world.

^[17] Therese Delpech (1948–2012) served as an aid to Bertrand Goldschmidt before she became the director of strategic studies at the French Atomic Energy Commission in 1997. Delpech was also an advisor to the International Committee of the Red Cross and a commissioner on the United Nations Monitoring, Verification and Inspection Commission.

^[18] David Ben-Gurion (1886–1973) was Israel's first prime minister, serving non-consecutive terms from 1948 to 1954 and 1955 to 1963.

^[19] *The Caine Mutiny Court Martial* is a play by Herman Wouk about the US navy. It was adapted from his own book, *The Caine Mutiny* and first performed in 1953.

^[20] Sde Boker is a kibbutz in the Negev Desert where Prime Minister David Ben-Gurion later made his retirement home.

^[21] The Negev desert is Israel's largest desert, covering the southern half of the country.

^[22] La Société alsacienne de constructions mécaniques is a mechanical engineering company that produced the first atomic pile for Marcoule.

^[23] The EL-2 and the EL-3 are reactors in Saclay, France. The EL-102 was the original design for the reactor in Dimona, Israel, and was based off the EL-3; however, the reactor that was eventually built is much larger.

^[24] The Suez campaign (19 October 1956–9 November 1956), also known as the Suez crisis, was a coordinated military campaign against Egypt by France, Great Britain, and Israel in response to the nationalization of the Suez Canal by Egyptian President Gamal Nasser. The crisis was ended by joint pressure from the Soviet Union and the United States.

^[25] Christian Pineau (1904–1995) was the French minister of foreign affairs from 1956 to 1958.

^[26] Golda Meir (1898–1978) was Israel's fourth prime minister, in office from 1969 to 1974.

^[27] Francois de Rose (1910–) was a French diplomat specializing in nuclear issues. He was appointed to the Commissariat à l'Energie Atomique in 1961.

^[28] Maurice Bourgès-Maunoury (1914–1993) was prime minister of France in 1957.

^[29] Jules Horowitz (1921–1995) was a member of the Commissariat à l'Energie Atomique and a notable French physicist.

^[30] Saint-Gobain is a French company, founded in 1665, that specializes in the production of construction and high-

performance materials.

^[31] Shalheveth Freier (1920–1995) was one of Israel's science attaché's to France from 1956 to 1960 and director general of the Israel Atomic Energy Commission from 1971 to 1976.

^[32] Charles Lucet (1910–1990) represented France in the UN Security Council from 1953 to 1955. He was head of the French Foreign Ministry Department of Political Affairs from 1959 to 1965 and was the French ambassador to the United States during the Johnson and Nixon administrations.

^[33] John McCone (1902–1991) was head of the U.S. Atomic Energy Commission from 1958 to 1961 and the director of Central Intelligence from 1961 to 1965.

^[34] Paolo Emilio Taviani (1912–2001) was the Italian minister of defense from 1953 to 1958 and the minister of the interior from 1962 to 1968 and 1973 to 1974.

^[35] Franz Josef Strauss (1915–1988) was the minister president of Bavaria from 1978 to 1988. Before becoming minister president, Strauss held numerous governmental positions including minister of finance, minister of defense, and minister of atomic affairs.

^[36] Félix Gaillard (1919–1970) was prime minister of France from 1957 to 1958.

^[37] Jacques Soustelle (1912–1990) was a noted figure in the French Free Forces during World War II. From 1955 to 1956 he was the governor general of Algeria, the minister of information in 1958 and the minister of nuclear energy from 1959 to 1960.

^[38] Maurice Couve de Murville (1907–1999) was the French minister of foreign affairs from 1958 to 1968 and prime minister of France from 1968 to 1969.

^[39] The chief of defense staff is a high level position in the French military responsible for assisting the minister of defense in the organization of the French armed forces, maintaining general strategy and planning for future military needs.

^[40] The Partial Test Ban Treaty of 1963 prohibits all test detonations of nuclear devices in the atmosphere, underwater, and in space. Testing was only permitted to continue underground.

^[41] The Atomic Energy Act of 1946, also known as the McMahon Act, established the US Atomic Energy Commission, directed control of nuclear weapons and energy development to civilian authorities, and created guidelines for the sharing of nuclear technology jointly developed with Great Britain and Canada. The amendment was passed in 1954, not 1958.

^[42] The Marcoule Nuclear Site is a large nuclear facility operated by the CEA near Avignon, France. The site opened in 1965 and was home to the first French industrial and military nuclear experiments.

^[43] Michel Jean-Pierre Debré (1912–1996) was the first prime minister of the French Fifth Republic, serving under President Charles de Gaulle from 1959 to 1962.

^[44] In 1989, Princeton Professor Richard Ullman published an article in *Foreign Affairs* entitled "The Covert French Connection" detailing American aid to French nuclear programs during the Nixon years. William Burr has expanded on Professor Ullman's work, using documents not available in 1989. Burr's work can be accessed at The Woodrow Wilson Center's Nuclear Proliferation International History Project's website via the following link: <http://www.wilsoncenter.org/publication/us-secret-assistance-to-the-french-nuclear-program-1969-1975-fourth-country-to-strategic>.

^[45] Emmanuelle "Manes" Pratt (1911–) was an engineer and colonel in the Israeli Defense Forces (IDF) from 1957 until 1966. Many consider Colonel Manes Pratt to be Israel's General Leslie Groves. He was also in charge of the construction of the Dimona reactor.