# The Mediterranean-Dead Sea Canal project: a personal account

by Uri S. Würzburger

*The following is the story of the Mediterranean-Dead Sea Canal project, as told by Uri S. Würzburger, the former managing director of the Mediterranean-Dead Sea Canal Company from its founding in 1981 to its closure in 1985. It was under Mr. Würzburger's direction that the full range of studies, plans, and design work was done for the project. Despite the fact that the project was not carried through to completion, due to a change in the Israeli government in 1985, all the necessary feasibility studies and planning had been nearly completed.*

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*The following personal account has been adapted from a discussion in Jerusalem on Nov. 1 between Mr. Würzburger and* EIR*'s Dean Andromidas and Paolo Raimondi.*

In 1898, a Swiss engineer named Max Burchardt completed a study on how to make use of the differences in the elevation between the Mediterranean and the Dead Sea. As you know, the Mediterranean is at zero sea level, and the Dead Sea is about 400 meters below sea level. But Burchardt was not the first one. The story started in the mid-19th century. As a matter of fact, Dr. Joseph Vardi, who spoke yesterday at the Jerusalem conference, did a historical study about all the people who have mentioned this project over the past 200 years.

At the beginning of this century, in 1902, Theodor Herzl, the founder of the Zionist organization, wrote a famous book on his version of modern Israel, titled *Altneuland* (*Old New Land*). In it, he took up the idea of Max Burchardt, describing the construction of turbines at the Dead Sea for the generation of electricity, and the industrial development of the region.

During this century the project has been raised time and again. Several committees were formed. One such committee was formed in 1948 following the creation of the state of Israel. The most serious step was taken at the beginning of 1974 after the so-called oil crisis which followed the November 1973 Yom Kippur War, when in a week the oil price jumped from $2.50 per barrel to $12. The minister of development, Haim Wati, appointed a committee to investigate the feasibility of building the project. The head of this committee was Professor Epstein, who is now the president of Bar Ilan University. They published their first report in 1977, with preliminary recommendations from the engineering and economic points of view.

On Nov. 14, 1977, another committee was formed under the direction of Prof. Yuval Ne'eman; this committee was appointed not by a minister, but directly by the government. At the beginning of 1981 they submitted their recommended routes, after several possible routes had been investigated—six altogether: one from Haifa to the Jordan Valley and then to the Dead Sea, one crossing the Samaria Mountains, one on the northern part of the Judea Mountains, one across the southern part of the Judea Mountains, the Katif-Malei route, and, of course, the so-called Dead-Red route.

On the basis of these projects, we have the difference in the elevation between the Mediterranean and Red seas and the Dead Sea. We also have something else: Something has happened to the Dead Sea over the past 50 years. The equilibrium of the Dead Sea has changed. For many years, there was an equilibrium between the amount of water flowing into the Dead Sea and coming out of the Dead Sea. Due to the fact that the Dead Sea is the lowest point of the world, there is no way that the water can go out of the Dead Sea; water escapes only through evaporation. In the late 1950s and beginning of the 1960s, Israel built the National Water Carrier, taking the water out of the Sea of Galilee (Lake Tiberias, which is 200 meters below sea level), pumping it up into pipes, and taking the water all over the country. [See map in *EIR*, Oct. 29, 1993, p. 11.] The Jordanians built the Ghor Canal from the Yarmuk River, the second after the Jordan River, which comes into the Jordan a few kilometers south the Sea of Galilee. This Jordanian water carrier parallels the Jordan on the eastern side, and is used to cultivate the Jordanian part of the Jordan Valley. Due to this fact, the total amount of water which comes into the Dead Sea has been reduced from 1.4 billion cubic meters per year to about 300 million cubic meters.

As you can see from the thin line in **Figure 1,** at the beginning of the century, the level of the Dead Sea was about about −390 m, with some annual fluctuations. At the beginning of the 1930s, a dam was built on the southern end of the Sea of Galilee. This gives us the first drop. Then in the

late 1950s and the early 1960s, we built the National Water Carrier, as did the Jordanians theirs, giving us the second big drop. The graph ends at 1984; now we are at about −408 m.

The thick line in Figure 1 is my estimate of the change over time of the amount of water coming into the Dead Sea through the Jordan River alone. In the 1930s we had about 850 million cubic meters entering the Dead Sea from the Jordan. This quantity has now dropped to about 150 million cubic meters.

The *area* of the Dead Sea has been already reduced by 30%. It will not continue at the same speed, because the southern part is divided into two parts, and is very shallow, only 4-6 meters. The northern part is very deep, about 330 meters. So the southern part is already dry. To be precise, we do still have some water in the southern part, but this part is now used by the Israeli and Jordanian potash works as evaporation points, because the production of potash is based on evaporation. The only way to extract potash, bromine, and magnesium from the Dead Sea is using solar energy. I always used to say that this was the first plan in the world using solar energy in huge quantities, because the amount of potash in the Dead Sea is very low, and only by evaporating water at special evaporation points can you extract it. So we are pumping water here into these evaporation points by a channel 12 km long. This southern part is divided, and the Jordanians are doing exactly the same thing on their side. The western part belongs to us, the eastern part to the Jordanians.

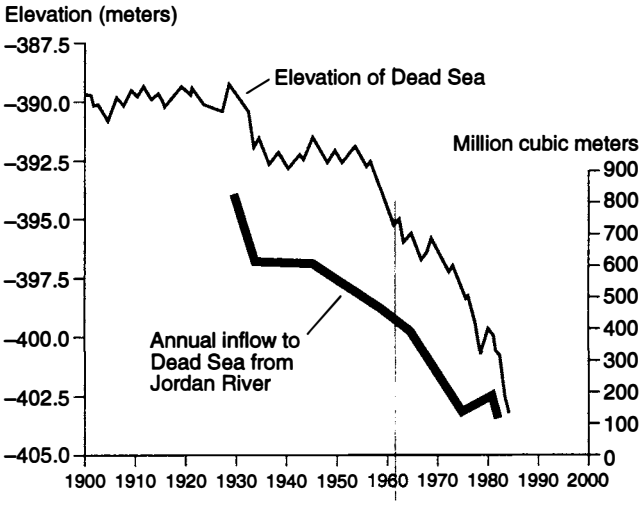
Nowadays we are talking about collaboration. This is a good example. We built our evaporation points many years before the Jordanians, who only started them in the 1970s. There was a problem: This was the original southern part of the lake. We built a dam here and used this part as evaporation points. Floodwaters from the south continued to come flowing into the Dead Sea. Then the Jordanians wanted to use their half for their own evaporation points. They, too, had to build a dam; but what would happen with the floodwaters coming from the south? So it was a silent agreement between the Jordanians and Israelis, that we should have a channel about 500 m wide to allow the floods to come through, a silent agreement, and everyone was happy.

To return to the basic idea: It is on the one hand to utilize the differences in elevation from the Mediterranean and Red seas and the Dead Sea, and on the other hand to rectify the change in the equilibrium caused by the human intervention when the fresh water from the Sea of Galilee and the Yarmuk River was drawn upon by Israel and Jordan.

## Planning the project

In 1981, the government decided to form the Mediterranean-Dead Sea Canal Company with the task of planning and studying all the details and problems involved in building the canal. Isaac Modai, even more than Shimon Peres, was the big pusher of the project. The route decided was the one recommended by the Yuval Ne'eman committee. This was

FIGURE 1
**The Dead Sea's level has been dropping steadily since 1930**




Source: Uri S. Würzburger.

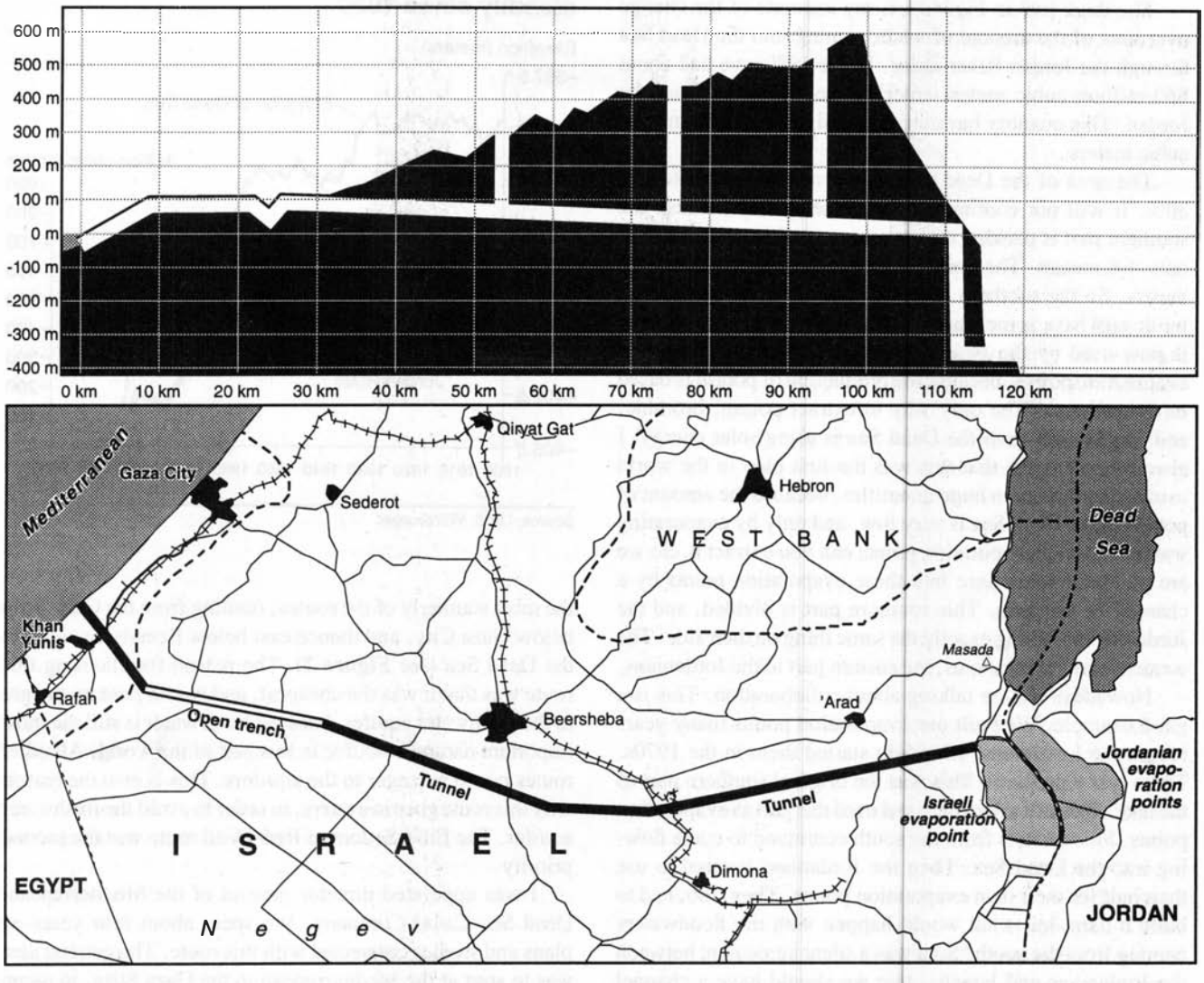
the most southerly of the routes, running from the Gaza Strip below Gaza City, and thence east below Beersheba and into the Dead Sea (see **Figure 2**). The reason for choosing this route was that it was the cheapest, and would pose no danger to the freshwater aquifer, because fresh water is still the most important natural resource in this part of the world. All other routes posed a danger to the aquifers. This is also the reason why this route goes in a curve, in order to avoid the freshwater aquifer. The Eilat-Sedom or Red-Dead route was the second priority.

I was appointed director general of the Mediterranean-Dead Sea Canal Company. We spent about four years on plans and studies connected with this route. The general idea was to start at the Mediterranean in the Gaza Strip, to pump the water from zero to +100 m, then to have an open canal about 20 km in length, and then a tunnel about 80 km long, and three vertical shafts, terminating at the Dead Sea. Just before the termination, there would be a reservoir, followed by a shaft going downward, at the bottom of which there would be four turbines of 200 megawatts each, and then an outlet channel into the Dead Sea.

We did test drillings along the proposed route, studies at the Mediterranean, studies at the Dead Sea, and studies from the environmental point of view. We studied what the chemical reaction would be from Mediterranean water mixing with the Dead Sea water, and what would happen to the elevation of the Dead Sea. I have a thick volume of only the abstracts of the studies which we carried out. It is a library. And of course, we did the overall general construction planning of the project.

FIGURE 2

**Best route and location of shafts for Mediterranean-Dead Sea Canal**




Source: Uri S. Würzburger.

After we completed the general planning and design work, which was done by the Israeli Tahal engineering firm, we decided we needed to subject the plans to critical review. So, we asked several companies all over the world if they were willing to do that. Unfortunately, many famous companies refused. Finally, we had about eight companies from the United States, England, Scotland, Canada, France, and South Africa, and we compared their different offers, and finally narrowed our choice to two companies, each of which had the advantage of carrying out such a review but in different fields. We thought the two companies together would be able to carry out the job. One of them was a company called Williamson, of Glasgow, Scotland, and the second was Beck in Seattle, Washington. I traveled to Glasgow to discuss their offer, and finally asked them if they were willing to do the critical study jointly with someone else. They said it depended on who it would be. So I told them I would let them know. Then I went to Seattle and met the management of Beck, and asked them the same thing. They also said it depended on who it would be, and I told them it was Williamson from Glasgow. They said, "All right, give us two hours and we shall give you an answer." Two hours later, they connected up with Glascow and they formed a consortium, Beck-Williamson. They worked here about a year on a very critical review of the project.

In the meantime we started an exploratory tunnel, since one of our problems was the fact that it would have to cross quite a few fault lines. But we only completed 700 meters of

the tunnel, because at this stage the whole project was stopped. We had a change of government.

There were a lot of discussions concerning the economy of the project. The most attractive aspect of this type of hydroelectric power project, from an economic point of view, was to use the electricity only at peak hours. It would have helped to solve one of the main problems we have, because all our electricity right now comes from steam power stations located along the Mediterranean. As you know, with steam you always have to be running 24 hours around the clock, but the need of the electricity in Israel goes in such a way that in the summer we have a peak at lunchtime, and in the winter we have a peak in the evening. At night we have very low electricity consumption. Nonetheless you have to build your steam power stations to always be able to cover the peak. So you have a lot of waste of electricity. The idea was therefore to pump water into the reservoir 24 hours a day, and then to generate power only for six hours during the peak hours. From this point of view the value of this electricity is three to four times higher then the average.

We also recommended that the project be built in two stages. Begin with a pump storage scheme. As you know, if you have overcapacity of electricity, you can pump water from a low point to a high point, and when you need it, you send it back through the turbine and produce electricity. Although there is some waste of electricity when you pump up and down, the high price of electricity at peak hours makes it economical.

Because the whole project would take about 11 or 12 years to build at high rates of interest during construction, we proposed first building the hydroelectric power station as a pump storage scheme, and building the waterway at a later stage.

## The satellite projects

Another point we investigated was what could be done with the seawater as it crossed the Negev Desert. . . . We also checked the possibilities for a nuclear power station since if we were to build a nuclear power station in this country, it would have to be situated somewhere in the south.

Some studies on desalination were carried out. I think it is doubtful that it makes sense to use this electricity for desalination. Why? Because the advantage of this electricity is for the peak hours. This is expensive electricity, don't forget, so therefore it should be used only for peak hours. Desalination, on the other hand, requires cheap electricity. We can use the Med-Dead and Red-Dead as a pipeline for bringing salt water into the desert for desalination, but we must use cheap electricity. We can use nuclear power if it is cheap.

Many people are enthusiastic, without knowing what they are talking about. I don't know whether there is any other project with such a lot of enthusiasm and vision; but people are forgetting its economy. This is a pity. It should be economic.

## The Red-Dead Sea Canal and the peace process

Since Febuary 1991, I have been a member of the bilateral talks in Washington. Up until 1992 I was the director general of the Ministry of Energy, so I was asked to take part at the peace talks with the Jordanians. They were very interested in this project. The head of the Hydroelectrical Institute in Jordan published a paper in 1984 at the geological conference in Moscow, and I met him there. His paper described all the benefits which Jordan would have if we built this canal. During the same period, the Jordanian politicians spoke everywhere, in the United Nations and everywhere else, against this project.

So from the professional point of view he published a paper on the advantages. The only disagreement we had, was that we wanted to come back to the level of −390 m, while he said it should only come back to −393 m. So I said we should compromise and come to −391.5.

The Jordanians were of course interested in the Red-Dead route. They did a study back in 1979 in Harza concerning a Jordanian route on the eastern part. We had checked the possibility, of course, of a western route. During the talks in Washington, I told our Jordanian colleagues that although we believed the Med-Dead would be the best one to serve as a trigger for peace, Israel would also be ready to support the Red-Dead canal as a second priority.

It is necessary first to ascertain what would be the right route between the Red and Dead seas. I imagine that this new route may cross borders, and would need more than one power station, because instead of a clear cliff of 400 m, it is much more complicated, and we need two or three power stations to divide the elevations along the 180 km.

But this was only a theoretical discussion, because the Jordanians said that as long as we don't have a final peace agreement, nothing can be done. It was most difficult to convince them to start. We have a problem in the Rift Valley, where there are horizontal movements even today. The Jordanian part is moving toward the north. These parallel movements have already shifted 100 km during the geological periods. But this movement still continues, and I told the Jordanians that it is worthwile to start as soon as possible with detailed measurements on both sides of the borders to check exactly this movement and to study what would be the influence on the route. I suggested that, if necessary, a third country could carry out a purely scientific study. I did not succeed. They said, "First of all, let's agree about the politics."

I am very sorry that the project was stopped in 1985. Although there was discussion of its economic feasibility, given the drop in oil prices since we started, this was not the reason. The reason was internal politics. Check the politics in it, and not the economics, because there has been no change in the economics of this project between 1985 and 1993.