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THE WAR OVER WATER

by John K. Cooley

“Water is not necessary to life but rather life itself,” the French poet and aviator Antoine de Saint-Exupéry wrote on the basis of his vast experience in arid countries. His observation highlights a fundamental of Middle East politics that has lately been forgotten by nearly everyone except Israel and its Arab neighbors. Indeed, long after oil runs out, water is likely to cause wars, cement peace, and make and break empires and alliances in the region, as it has for thousands of years.

The constant struggle for the waters of the Jordan, Litani, Orontes, Yarmuk, and other life-giving Middle East rivers, little understood outside the region, was a principal cause of the 1967 Arab-Israeli war and could help spark a new all-out conflict. It is also a major aspect of the Palestinian question and of the struggle over the future of the West Bank. Since 1947 many an attempt has been made to write peace documents or draw new cease-fire agreements between Israel and its neighbors. Each time, the water question has helped to block agreement. While the need for a rational, overall water-sharing scheme steadily grows more apparent, it seems less attainable, as water issues are aggravated by political tensions and by the fact that, while its neighbors' consumptions are rapidly rising, Israel still consumes roughly five times as much water per capita as each of its less industrialized and less intensively farmed neighbors.

In 1967 Israel went to war against Syria, and Syria's ally, Egypt, partly because the Arabs had unsuccessfully tried to divert into Arab rivers Jordan River headwaters that feed Israel. During that war Israel captured Syria's Baniyas River, the last of the important Jordan headwaters not under Israel's control. Israel also succeeded in destroying the foundations

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and thus halting construction of a giant new dam at Mukheiba on the Yarmuk River, which runs toward Israel between Jordan and Syria. This dam, still desired by Amman and enjoying American and World Bank (International Bank for Reconstruction and Development) backing, would have greatly augmented the water available to pre-1967 Jordan, including the West Bank, but might have deprived Israel of water supplies its planners coveted.

Today the threat of a war stems primarily from Israel's occupation of southern Lebanon. Launched ostensibly to drive out the Palestinian fighters, Israel's June 1982 invasion of Lebanon gave the Jewish state control of the lower reaches of a new river—Lebanon's Litani. The Litani has never flowed into Israel, and the invasion strengthened long-held Arab convictions that capturing its waters and diverting them into Israel has been an important long-term Israeli goal. Official Israeli government silence on the issue and continued expressions of interest in the Litani by Israeli hawks, such as former Defense Minister Ariel Sharon and Technology Minister Yuval Neeman, only serve to fuel Arab fears.

Meanwhile, as early as May 1983, Syrian officials informed the Lebanese government of President Amin Gemayel that Syrian troops would not leave Lebanon until Damascus had obtained, as part of an overall accord protecting Syrian interests in Lebanon, an ironbound water agreement. Syria wanted absolute guarantees that headwaters of the Orontes River, which rises in Lebanon's fertile Bekaa Valley, would never be seized by hostile forces. The Orontes irrigates much of Syria's best farm land and provides both drinking water and electric power for western Syria, the country's most populous region.

Meanwhile, the major project Israel has proposed to solve some of its own water and hydroelectric power problems poses some potentially serious difficulties for another neighbor, Jordan. This project, known as the Med-Dead Canal, would be a saltwater conduit linking the Mediterranean Sea near Gaza with the saline Dead Sea. The canal would use the drop of about 1,300 feet as the water flows

east into the Dead Sea basin to drive electric turbines. Practical designs for the canal were drawn up by James Hayes and Joseph Cotton, American water consultants to the Water Planning Authority of Israel. At that time, Israeli Finance Minister Pinhas Sapir said the canal would "compensate the Dead Sea for the diversion of the Jordan River into the [Israeli] diversion system."

Yet the project has alarmed the Arab states, especially Jordan. They have studied delaying or halting the scheme. Specifically, Jordan fears that the rise in the level of the Dead Sea caused by the influx of Mediterranean water will destroy the phosphate extraction and other chemical industries Amman has built on its own side of the Dead Sea, opposite Israel's chemical and nuclear complexes at Arad and Dimona. This fear was heightened by the confirming findings of a 1981 Israeli parliamentary commission report. Jordanians have also feared for the last two generations that the Med-Dead Canal would ruin Jordan's already well-advanced plans for reclaiming for Jordanian agriculture much of the salt-saturated Wadi Araba region southeast of the Dead Sea and pollute much of the still-fresh waters of the Jordan Valley's streams and aquifers. Israel's economic planning already takes these effects into account; Jordan's economy would need to make costly adjustments.

Rainfall and Politics

The Middle East's problems of water and agriculture stem fundamentally from its climate, not from politics. Seasonal temperature variations are wide and rainfall is highly irregular. On the whole the region simply does not receive enough rainfall to support even subsistence agriculture without extensive irrigation. The scarcity of water has weighed upon the region's life since prehistoric times.

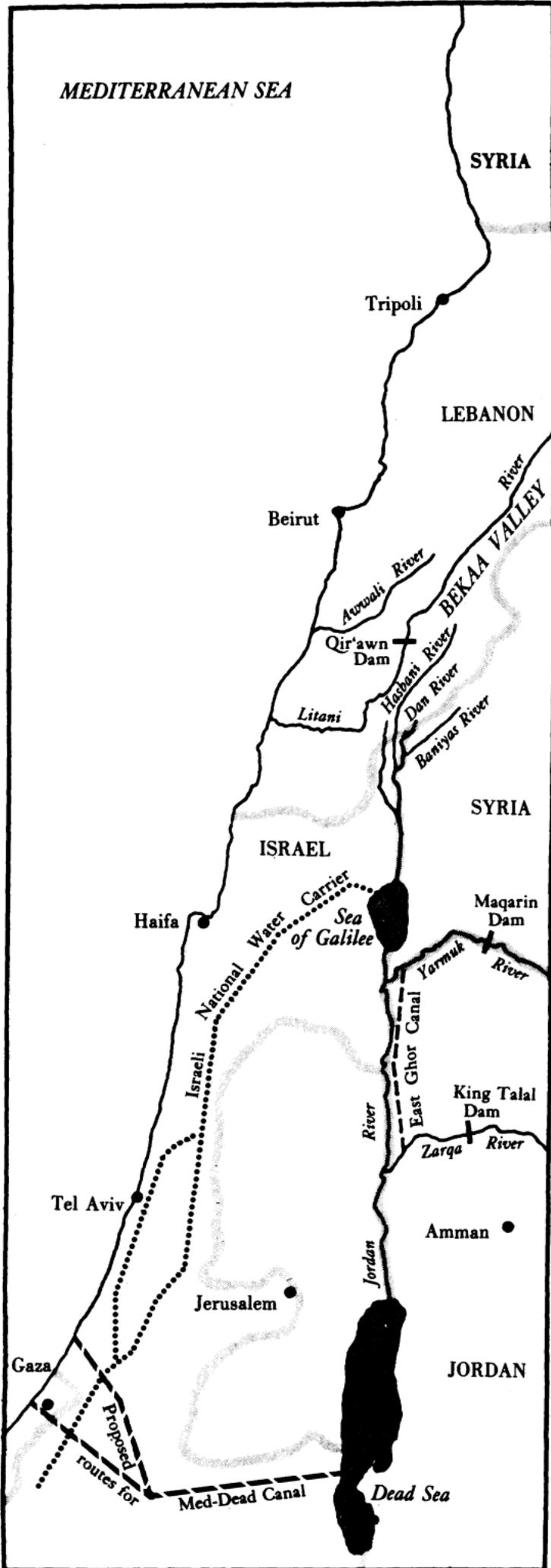
Permanent farms require at least eight inches of water a year—enough to sustain the grass needed to raise sheep, goats, donkeys, and camels. Somewhat more rainfall is needed to grow most vegetables and fruits. Wherever rainfall reaches these levels, villages and towns can be built. And where water supplies are supplemented by rivers and wells, cities such

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as Alexandria, Baghdad, Damascus, and Tehran have been able to grow. Inadequate or excessively erratic rainfall forces people to stay on the move and live as herdsmen or migrant farmers—like those of the American dust bowl of the 1930s. They seek the oases: islands in the desert where spring water or cisterns can be found. And if a season passes without restorative rain, desertification sets in. Indeed, Arab literature is filled with delighted, sensitive accounts of the coming of rain, a momentous event, and the Arabic language has a special verb—*sbama*—that means “to watch for lightning flashes to see where rain will fall.”

Despite all the talk of “making the desert bloom,” cultivated land still represents no more than 5–7.5 per cent of the Middle East. The rest is mainly desert, mountain, or swamp. Yet a large percentage of the region’s population—including a majority in Syria—depends directly on agriculture for its livelihood. Many others work as cotton and tobacco packers, fruit driers, or canners of vegetables, fruit, or olive oil. Paradoxically, however, agriculture represents less than half the gross national product of Egypt, Israel, Jordan, Lebanon, and Syria. Thus for most Middle Eastern countries food production for domestic consumption or export remains the least successful aspect of national economic development.

The Middle East’s water problems are regional, deriving from common sources, and cannot be regarded solely as an Arab-Israeli problem. In fact, the Arab states have quarreled among themselves about water. But the water problem’s Arab-Israeli dimension is vitally important and is rooted in Israel’s original diversion of Jordan River waters after 1948. Since the Palestinian Arabs displaced during the Israeli war of independence and their Arab supporters considered the Israeli state to be illegitimate, they persistently decried the unilateral diversion of the Jordan as completely illegal and utterly nefarious. The Israelis responded that the surrounding Arabs were never willing to let Israel live in peace, that most remained in a state of war with



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Israel, and that Israel never intended to deprive Arab neighbors of water they needed.

The Jordan River rises in the hills and mountains that make up the Anti-Lebanon range in eastern Lebanon. As the Jordan flows south through the beginning of the Great Rift Valley, it is fed from underground sources and an intricate network of smaller rivers, rivulets, and streams at various points in Jordan, Israel, Syria, and Lebanon. The Jordan continues southward into the middle of the Jordan Valley, forming the border between East Jordan and Israeli-occupied West Jordan (Judaea and Samaria, in official Israeli parlance). The Jordan's main sources are the Hasbani River, which flows from Lebanon into Israel; the Yarmuk River, which rises near the Golan Heights and flows downward between Jordan and the Golan Heights; the Baniyas River, which also originates in Syria; and the Dan River, which rises and flows inside Israel.

The Litani flows entirely inside Lebanon. From its source in the north-central region of the country, it runs south through Lake Qir'awn to a point below steep cliffs where the 11th-century Crusader castle of Beaufort guards the Lebanese-Israeli frontier. The river then makes a sharp right turn in the gorges beneath Beaufort and empties into the Mediterranean. Along the way, it irrigates Lebanon's lush Bekaa Valley and many of the orchards, California-style truck farms, and tobacco fields of Lebanon's southwest.

As World War II still raged, the problem of accommodating the needs of the native Palestinian Jews and Arabs and the hundreds of thousands of new European Jewish immigrants crowding into Palestine became acute. Zionist leaders argued that exploiting the Jordan Valley's untapped water, electric power, and agricultural resources held the key to a peaceful future. One such scheme was proposed in 1944 by Walter Clay Lowdermilk, an American water engineer, in his book *Palestine: Land of Promise*. After extensive studies conducted in Palestine for the U.S. Department of Agriculture, Lowdermilk proposed using the waters of the Jordan, Yarmuk, Baniyas, Hasbani, Dan, and Zarqa (a river in

East Jordan) in a comprehensive plan to irrigate the Jordan Valley, much of northern Galilee, and northern Palestine. Lowdermilk and other succeeding American consultants also suggested diverting the Litani in southern Lebanon to form an artificial lake in northern Palestine whose waters would be pumped southward to irrigate the Negev Desert. And Lowdermilk proposed an early version of the Med-Dead Canal as well.

The Arab-Israeli wars of 1947–1948, which surrounded Israel's creation, vastly complicated the task of those who sought a regional water solution. In particular, none of them could have foreseen that 420,000 Palestinian Arabs would flee eastward, to settle on either the Jordan River's West Bank, which Amman would soon annex, or on the East Bank, in Jordan proper.

The new state of Israel came to rely for most of its water on the diversion of between 50 and 75 per cent of the Jordan River's flow, depending on whether one accepts Israeli or Arab figures. Israel's main diversion project is the National Water Carrier, a large conduit capable of channeling 11 billion cubic feet annually from the Sea of Galilee (Lake Tiberias) to Rosh Haayin, near Tel Aviv. To carry water from the Jordan and its headwaters as far as the Negev Desert, pipeline and canal systems such as the Yarkon-Negev project were built. These new waterways permitted cultivation of some additional desert land. But more important, they enabled Israelis to recultivate, by more intensive farming methods such as drip irrigation, the areas from which the Palestinian Arabs had fled.

According to early Israeli statistics, cultivated land increased from 400,000 acres in Israel's first full crop year, 1948–1949, to more than 1.1 million acres in 1977–1978, about 500,000 acres of which are irrigated. Since Operation Litani in 1978, Israel's first major invasion of southern Lebanon, which was intended to drive the forces of the Palestine Liberation Organization (PLO) back across the Litani, the Israeli government has not published full water and cultivation figures. The country's total 1980 water consumption, however, was authoritatively estimated at 64 billion cubic

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feet, of which about 42 billion cubic feet are used in agriculture.

It is impossible to say how much of this water Israel's less developed neighbors might have used in the past or could use in the future. What is certain is that all of the water development plans of the region's countries depend on tapping the region's rivers. Not surprisingly, to the Arabs in the 1950s the National Water Carrier became a symbol of Israel's aggressive expansionism. As early as 1953, Syrian artillery units opened fire on the construction and engineering sites behind the town and lake of Tiberias, forcing the Israelis to move the main pumping station.

This incident helped convince the United States that the water dispute both reflected and aggravated the political conflict sparked by the exodus of the Palestinian Arabs. President Dwight Eisenhower appointed motion-picture magnate Eric Johnston to perform the herculean labor of negotiating regional water-sharing arrangements. Johnston presented a series of proposals based largely on the work of Charles T. Main, Inc., a Boston, Massachusetts, consulting firm. A fundamental tenet of international law underlay these proposals: Water within one catchment area should not be diverted outside that area—regardless of political boundaries—until all needs of those within the catchment area are satisfied. Since it was already clear that nothing would deter Israel from sending Jordan River water as far as the Negev Desert, U.S. negotiators focused on other ways of meeting the needs of both Arabs and Israelis in the catchment areas of Galilee, southern Lebanon, and western Syria.

Long after oil runs out, water is likely to cause wars, cement peace, and make and break empires and alliances in the region.

The Johnston proposals began with a series of dams on the Hasbani, Baniyas, and Dan rivers in Lebanon, Syria, and Israel, which would feed a canal to water Galilee farm land. The Huleh swamps were to be drained, a

project soon carried out by Israel. A high dam was to be built on the Yarmuk River, a project still in abeyance. Finally, smaller works were called for to irrigate both sides of the Jordan Valley. One of these projects was Jordan's East Ghor Canal, eventually built mainly with U.S. foreign assistance.

The American planners thought that the Johnston proposals would preserve the catchment area principle. Indeed, the Israeli National Water Carrier was not yet complete. The proposals allotted Syria 1.6 billion cubic feet of water a year; Jordan, 27.3 billion; and Israel, 13.9 billion. But all three states objected to the scheme. The Arab states wanted larger shares, especially for Syria. They also insisted on an international board to supervise the allocation of regional water resources. Israel, too, wanted much more water and rejected giving a board containing Arab members any control over Israeli water supplies. A major Israeli counterproposal was prepared by Cotton in 1954. It differed from the Johnston proposals primarily by reviving the idea of diverting Lebanon's Litani River into Israel.

Notwithstanding these changes favored by Israel, the original Johnston proposals seemed, at times, to be drawing Israel and the Arab states toward a technical accord on sharing water resources that might have paved the way to wider political agreements. President Gamal Abdel Nasser of Egypt became actively involved in the process because Johnston submitted another set of proposals designed to deal with the Arab-Israeli conflict and the Palestinian problem simultaneously. Along with U.N. officials, Johnston envisaged using a canal from the Nile River to irrigate the western Sinai Desert and resettling some of the 2 million Palestinian Arab refugees in the one-time wasteland.

When the late Egyptian President Anwar el-Sadat revived this idea after his historic 1977 trip to Jerusalem, his seemingly cavalier treatment of the country's most precious natural resource outraged many Egyptians. Western interest in this concept revealed a total lack of understanding of the Palestinian problem. The refugees' concern was recovering their homes, farm lands, and jobs, not helping

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to make the Sinai Desert bloom. However, Egypt's involvement in the regional water controversy undoubtedly helped to spur its own grandiose projects for developing the Nile Valley—plans that centered around the highly political question of whether the Soviets or the Americans would build the high dam at Aswan.

The Egyptians also participated directly in the discussions on the Johnston proposals for the Israel-Jordan area: Johnston himself disclosed that Egypt was urging Jordan, Lebanon, and Syria to accept them. Indeed, then Egyptian Foreign Minister Mahmoud Riyad headed an Arab League committee set up to prepare a far-reaching, pan-Arab, regional water plan, which Nasser hoped that Israel would have no choice but to accept. According to his diaries, throughout the early 1950s dovish Israeli Prime Minister Moshe Sharett favored working with the American proposals and discussed a number of water plans with his cabinet, including the Litani diversion. Sharett also sought ways to open both public and secret conversations with Nasser.

Riyad, however, insisted that Israel's inclusion of the Litani River ruined any hopes of a regional agreement, since the project would doom Lebanon's hopes for developing its underdeveloped south and sully Arab honor. By the time Israeli leaders told Washington in early 1955 that they would drop the Litani idea, political tensions were rising for other reasons. Israel had responded to the beginning of guerrilla attacks from Gaza with a massive raid on the area; Nasser had decided to buy Soviet arms through Czechoslovakia; and the West had organized friendly regimes in Iraq, Jordan, and Turkey into the Baghdad Pact. There was talk of an Arab water diversion project that would pump the Hasbani River in Lebanon into the Litani, to prevent any of the Hasbani from watering Israel.

At this point, Sharett left the Israeli government. Doves began to vanish from the Mideast scene. Hawks moved into the ascendant, and Nasser's mood became more defiant. In July 1956 the United States refused to finance the Aswan High Dam, which the Soviets then took over as their showcase

project in the Arab world. Nasser dropped the Johnston proposals and all of their offshoots, consigning the mission to history.

Water and the PLO

Arab-Israeli wars twice totally disrupted the economy and demography of Jordan, first in 1948, then again in 1967. The kingdom's annexation after the 1948 war of the 2,165 square miles of the West Bank, a rocky salient only partially suitable for irrigated cultivation, more than tripled its population, to 1.2 million. When Israel conquered the territory in 1967, about 300,000 of its inhabitants fled to unoccupied East Jordan. Today, about 1.9 million Arabs in the region are classified as refugees because their former homes or those of their parents were in Israel, Israeli-occupied territory, or pre-1948 Palestine.

Losing the West Bank in 1967 cost Jordan much of its foreign-exchange earnings from tourism, which centered on East Jerusalem and the well-watered oasis region of Jericho; its grain production, which had helped to feed many of the Palestinians who had stayed on in their temporary or permanent homes in the West Bank; and worst of all, 80 per cent of its total fruit-growing and 45 per cent of its vegetable-growing land, both of which had become valuable sources of export revenues during the 1950s and 1960s.

Yet by 1948 it was already clear that the Arab refugees on both the East and the West Banks could subsist by their own efforts only if the Jordan's waters were augmented by waters from the Yarmuk River. The intensifying Arab-Israeli political conflict also made it clear that Jordan and Syria could not count on using water from the Sea of Galilee.

Enter Millsunger, a water expert on the U.S. Point Four aid team in Amman. In winter 1951, while flying over the Yarmuk River valley, Bunker spotted an intriguing basin he realized could be turned with the help of a dam into a natural reservoir to hold excess winter flood waters from converging rivers and streams. Soon, the U.S. and Jordanian governments and the U.N. Relief and Works Agency for Palestinian Refugees jointly planned a 480-foot high dam for the Yar-

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muk River at the site, named Maqarin, and allocated nearly \$160 million for the venture. The dam was intended to store 18 billion cubic feet of water and feed canals that would water both the east and the west banks of the Jordan. A diversion dam would complete a system capable of irrigating both Jordanian and Syrian farm land without depending on Israel's Sea of Galilee.

To implement the Bunger plan, Syria and Jordan agreed in June 1953 on joint use of Yarmuk River water. But Israel, pushing to be included, laid claim to a share of the Yarmuk water. The Bunger plan quickly died, and the Syrians and Jordanians partially diverted the Yarmuk's flow for a brief time to irrigate farm lands in the eastern part of the Jordan Valley. The water controversy settled into a discouraging pattern for most of the decade. Local water projects went ahead, amid growing Arab anger over Israel's unilateral diversion of Jordan River waters and occasional military incidents that were sometimes raised in the U.N. Security Council.

But the Arabs also responded with their own diversion plans. As though to prove its Arab credentials, the Lebanese government showed an uncharacteristic zeal during the 1950s in attempting to thwart Israeli water plans. In 1959 the Arab League's technical committee called for boring a short tunnel to divert Lebanon's Hasbani River where it passed closest to the Litani, a place called Kaoukaba. Israel still takes this threat seriously. In 1982 Israeli invaders built a new road, a new bridge over the Litani, and a heavily fortified military camp, showing special vigilance over this area.

At this point, the water issue helped contribute to formation of the PLO. As long as the Israeli national water project was still under construction and Jordan River water was not actually flowing to the Negev Desert, Arab governments could oppose Israeli plans with safe rhetoric rather than potentially dangerous deeds. But Jordan's King Hussein and Nasser both realized the inherent threat they faced from the water problem. Action against the new Israeli water system might deprive Hussein, in the certain event of an Israeli counter-

attack, of the West Bank (as it eventually did in 1967). Inaction could cost Nasser the claim to Arab leadership he had been so carefully carving out, following the embarrassing collapse in 1961 of his Egyptian-Syrian United Arab Republic after only three years. The Arab states needed a formula that would permit them to resist Israel's designs without provoking disastrous reprisals.

In January 1964 Arab representatives gathered in Cairo at Nasser's request for the first of a series of summit conferences to work out a joint strategy on water. Yet instead of fashioning a new water strategy, the conferees dumped the water issue and all the other Arab-Israeli political problems into the lap of the Palestinians. The Cairo conferees decided to create a "Palestinian entity" to mobilize the Palestinians themselves for the eventual "liberation of Palestine." The PLO became this entity's financial, political, and military expression. It was to be supported by all of the Arab participants in the summit meeting. But in 1964, when the ineffectiveness of the PLO's leadership and of its nascent "conventional" military arm, the Palestine Liberation Army, became apparent, Yasir Arafat decided to act. Arafat had already founded al-Fatah (the Palestine National Liberation Movement) in secret in 1959. In the groups' writings and indoctrination programs, Arafat and the other Fatah leaders laid great stress on Israel's usurpation of Arab land and water resources.

The Golan Heights is as critical to Israeli water supplies as the West Bank's wells.

One of Arafat's closest associates, Dr. Nabil al-Shath, an American-trained engineer and business management specialist, told this writer in 1970, "The water issue was the crucial one. We considered our own impact on this to be the crucial test of our own war with Israel." Therefore, it was no accident that the first action of al-Assifa, Fatah's armed branch, was an unsuccessful attempt to sabotage the Israeli National Water Carrier on December 31, 1964.

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Meanwhile, the Arab governments continued their own efforts to create an Arab counterdiversion project. Work aimed at diverting the Baniyas was begun on Syrian territory. But three times, in March and May 1965 and July 1966, the Israeli army and air force attacked the site. Nasser called another Arab summit meeting in Cairo, where he acknowledged that Arab states were unprepared to go to war with Israel and urged them to admit it and accept the consequences. Nasser evidently forgot his own advice in the months preceding the disastrous 1967 war.

The Syrian project and the Israeli attacks created what Harvard University political scientist Nadav Safran calls "a prolonged chain reaction of border violence that linked directly to the events that led to war" in June 1967. In that war Israel captured and bulldozed about 50 Syrian villages in the Golan Heights. The Israeli advance forced about 100,000 Syrians to flee eastward and become refugees in their own country. Victory enabled Israel not only to build a system of strategic Jewish settlements in the Golan but also to prevent the Baniyas diversion by capturing the site of its Golan Heights headwaters, a site that the Romans had garrisoned to protect their water supplies.

The Six-Day War led Mideast states to abandon finally regional water projects and focus on the resources within their own frontiers. For Israel, the central problem was husbanding its dwindling domestic supplies and efficiently using sources captured from Jordan and Syria. Water in the Arab farmers' wells in the West Bank became a key element in Israeli strategy to hold the West Bank, Golan Heights, and Gaza, as it has subsequently been in moves to annex and absorb them. Israeli journalists, military men, and water engineers have spoken and written often of the need to "protect Jewish water supplies from encroaching Arab water wells." Military government regulations now forbid West Bank Arabs from drilling new wells without special authorization, which is almost impossible to obtain. Many existing wells have been blocked or sealed by the occupation authorities, in some cases to prevent their use from

draining nearby Jewish wells. Further, Arabs' access to water is determined by a rather restrictive consumption quota.

Israeli water experts explain that the ground water for northern and central Israel is supplied by two main aquifers. Both originate on the West Bank. They have apparently been augmented by another, originating from an underground lake, which extends beneath both banks of the Jordan.

Both of these aquifers drain westward toward the Mediterranean and are tapped by an elaborate system of wells along the coast between Haifa and Tel Aviv. Between these aquifers and the National Water Carrier, Israel draws its entire water consumption, although exact figures are closely guarded Israeli state secrets. Since 1967 the balanced functioning of the entire system has come to depend on a smooth, underground flow of water into Israel from the West Bank. The hydrological balance could be easily upset by interfering with the Hasbani, the Baniyas, the Dan, or the Yarmuk.

Keeping Tel Aviv, Haifa, and the other cities of the Israeli coastal plain from running dry depends on blocking Arab water development in the West Bank that could stop the aquifers' flow westward: hence the ban on Arab wells. Westward-flowing underground water also helps to stabilize pressure and prevent Mediterranean water from intruding into Israel's own coastal water wells. Some such saline pollution had befouled the Israeli coastal aquifers before the 1967 war and before the upper Jordan headwaters had been completely diverted.

The Golan Heights is as critical to Israeli water supplies as the West Bank's wells. About one-quarter of Israel's water is taken from the Sea of Galilee and channeled through the water carrier. Most of this water is used for consumption and industry in central and southern Israel. Syrian control of the Golan placed the upper Jordan basin's freshwater supplies beyond Israel's pre-emptive reach. Israel reversed this situation first by capturing the Golan Heights in 1967 and then by effectively annexing the region in 1981. Israeli leaders view maintaining access to this water

largely as a military problem: Holding on to the territory is necessary to protect an intake system and pumping works embedded in rock cliffs just south of Kafer Nahum. The system can easily be hit by artillery on the Golan ridges overlooking the Sea of Galilee.

Although Israel has striven to make itself self-sufficient in water supplies and under the leadership of former Prime Minister Menachem Begin grew increasingly secretive about water issues, Jordan's water plans anticipate a real peace settlement with Israel that would permit regional water sharing. The keystone of Jordan's effort is the East Ghor Canal, designed by a team of Jordanian and American water engineers in 1957 and built with Kuwaiti and West European support. This 42-mile-long, concrete-lined, gravity canal was deliberately designed so that it could one day be fed by a gravity canal from the Sea of Galilee, if water sharing with Israel became a reality. Hussein's planners, however, have always felt that the only way to develop the Jordan Valley over the long run is to return to the idea of damming the Yarmuk River.

Loss [of Litani River water] would rule out effective irrigation of the southern Lebanon panhandle and would ultimately turn much of the region into a desert.

Between the June war, the ensuing war of attrition, and finally the outbreak of fighting between Jordan and the PLO, which led in 1970–1971 to Hussein's final expulsion of the guerrillas, the late 1960s and early 1970s were a disaster for the Jordan Valley. Most of its 60,000 pre-1967 inhabitants fled eastward, swelling the populations of Amman, Salt, and Irbid. Further, Israeli commando raids against the PLO continued to disrupt normal life in the valley and its water system—despite the efforts of 700 dedicated staff members of the East Ghor Canal authority who stayed on to keep the water flowing. Finally, Israeli napalm and phosphorous shells devastated thousands of acres of good land.

Only in early fall 1971, when calm was restored after the Royal Jordanian Army defeated the PLO, did people return to the valley. Taking charge of the regional reconstruction effort was Crown Prince Hassan, Hussein's brother, then a 23-year-old Oxford University graduate. By 1975, when approximately \$200 million had been raised for the task, Jordan had drawn up a comprehensive Jordanian water plan, involving construction of the King Talal Dam on the Zarqa River, a major new irrigation network, and smaller projects at nine wadis, as well as measures to expand the East Ghor Canal and to control flooding.

The first stage of this Jordan Valley Development Plan, one of the more successful ventures funded in part by U.S. foreign aid in the Mideast, was finished by 1980, including the King Talal Dam and a Zarqa triangle irrigation project. Indeed, by 1981 plastic tunnels, greenhouses, and drip irrigation, once a sure sign of Israeli-farmed territory, had spread through the valley on the East Bank, enabling Jordan to export large amounts of fruits and vegetables to other Arab states and beyond.

Jordan's current 1981-1985 national development plan provides for investing about \$1.6 billion in agriculture and boosting agricultural income by about 7 per cent annually, mainly through expanding the irrigated zone in the Jordan Valley and the southern Ghor region. But water is still a scarce commodity in Jordan, and by the mid-1970s water rationing in big cities like Amman and Irbid attested to the need for a major new water source. So in 1975 the kingdom put the Maqarin Dam back on the agenda of the Jordan Valley Commission's seven-year (1975-1982) plan. Preliminary work began in 1976. The Carter administration then began to take the same kind of special interest in Mideast water displayed by Eisenhower. U.S. planners realized that the Maqarin Dam could not only help Jordanian agriculture by controlling the Yarmuk's winter floods and providing water for irrigation projects but also give Syria and Israel a more even flow of water on a year-round basis. In 1980 the U.S. Agency for International Development loaned Jordan \$9

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million in addition to \$10 million previously committed for this \$1 billion project. The dam should irrigate a total of 52,000 acres and power a major hydroelectric project.

The Maqarin project is now being held up primarily by the Middle East's fundamental political problems. The start of the principal construction work is dependent on agreement among Israel, Syria, and Jordan on riparian rights. But Syria and Jordan have found it impossible to agree on dividing water shares, either under their 1953 water accord or on any other basis. And in 1978 Begin privately demanded that the Carter administration guarantee that Maqarin's construction would not affect the water already flowing into Israel's part of the Yarmuk triangle, just south of the Sea of Galilee, to water Israeli farms. The U.S. embassies in Israel and Jordan have quietly been trying to deal with this matter. And during a round of secret shuttle diplomacy just before the Lebanese crisis began to claim his attention in 1980–1981, U.S. negotiator Philip Habib tried patiently but in vain to elicit at least a tacit Maqarin agreement from the riparian states. The Lebanese war doomed this mission. By early 1984 Jordan was complaining that Syria had so increased its own offtake of Yarmuk water that it endangered Jordan's own supplies.

Sharing the Litani

Since Phoenician times, Lebanon's coastal towns and plantations have relied on water from the short, fast-flowing rivers that cut through the Lebanon mountains. The largest is the Awwali, where in September 1983 Israel redeployed invasion troops from the Shuf Mountains south of Beirut and established a new defensive line, touching off in the process the fierce mountain war that drew the American military into its first fire fights since Vietnam. Lebanon also contains the headwaters of the Orontes, which rises in the upper Bekaa Valley and is so vital to Syrian agriculture and industry. Thus Syria insists on solid security arrangements to protect these headwaters from hostile forces. But if Lebanon, or even only its central heartland, including Beirut, is to survive as a state, and if its

citizens are to continue growing crops and using electricity, they must continue to develop and harness the resources of the Litani.

Lebanese plans for the Litani go back to the early years of Israel's water planning. In 1948 newly independent Lebanon's Ministry of Public Works called for construction of a dam and a reservoir at the highest possible altitude in the Bekaa region, with a capacity large enough to compensate for seasonal fluctuations in the river's level. A detailed blueprint was produced in 1954, the same year as the Cotton plan, which proposed diverting part of the Litani water into Israel. Beirut decided to implement the hydroelectric phases first.

Construction of the Qir'awn Dam, as it was named, and its associated works began in 1957, but natural obstacles and Lebanon's first civil war delayed major progress. With aid from the Kuwait Fund for Arab Development, the United States, and some private Lebanese sources, the hydroelectric system was finally completed by 1967. Beirut's effective neutrality largely spared the project from the Six-Day War's ravages.

The dam can hold 10.2 billion cubic feet during all seasons, enough to meet irrigation needs during the summer dry season, when the Litani's cumulative flow declines from about 14 billion cubic feet from November to May, to roughly 5.3 billion cubic feet. The Markaba Tunnel, just south of the lake, carries some of this water four miles underground and into an underground power plant. There it falls through a 600-foot vertical pipe, or penstock, to drive two large turbines, each generating electric power for Beirut and other coastal cities. Below the power station, a small dam channels the used water westward—toward the coast—where it waters coastal orchards. Litani water not used for irrigation falls into a power plant 1,300 feet below in the Awwali River bed. Fortified Israeli positions near a small water diversion dam at Awwali and another power plant downstream at Joun give Israel a virtual stranglehold over the main water supplies for Beirut and the coastal towns.

Phase two of the original Litani Plan involved irrigating about 64,000 acres in the

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Bekaa Valley and another 118,000 acres in southern Lebanon's dry coastal hills. After many interruptions construction was nearly complete by the time Palestinian refugees arrived en masse in southern Lebanon, after their 1971 expulsion from Jordan when the Israeli attacks prompted by their bases and activities began.

Phase three, if it is carried out, will water southern Lebanon's arid panhandle. This is the heel of territory south of the Litani, where the last U.N. observers, brought in after the Israeli incursion of 1978, rub elbows uneasily with the forces of both Israel and those who followed its surrogate warlord, the late Lebanese Army Major Saad Haddad, and with other Lebanese (together with a few remaining Palestinians) who are conducting guerrilla operations against the Israelis. But despite the assistance of the World Bank and the U.N. Food and Agriculture Organization, phase three may turn out to be the most difficult of all to complete—unless the Israelis and their allies go ahead with it on their own and ignore the legal government of Lebanon in Beirut.

Litani River Authority Chairman Kamal al-Khoury says that to finish the last stage of irrigation the Beirut government must regain full sovereignty and control over its own territory, so that another small dam can be built on the river near the Khardaly Bridge. Water would then be collected in a reservoir south of the town of Marj'Uyn, stronghold of Haddad's followers.

Since the Israeli invasion, the old and well-known Israeli-American plans for diverting the Litani have placed several developments in a worrisome light in Lebanese eyes. For example, when they captured the dam and lake at Qir'awn in June 1982 after a short battle with the Syrians, the Israelis immediately seized all the hydrographic charts and technical documents relating to the Litani and its installations. The Israelis were openly augmenting the flow of the Hasbani across the frontier into Israel by laying surface pipes to catch the run-off and other water from the mountains and nearby springs.

Moreover, a watchful American military observer claims to have seen Israelis burying

pipes deep in a hillside near Marj'Uyn after the Israeli incursion of 1978, indicating that the Israelis might be secretly siphoning water underground from the Marj Plain in southern Lebanon into Israel, without affecting the measured flow of the Litani. Such a diversion would tap the extensive underground aquifer, which is fed by seepage from both the Litani and the Hasbani rivers and by underground streams from the Mount Hermon region. The site where the pipes and pumping equipment seem to have been secretly buried is near a World War II airfield built by the British and repaved and extended in fall 1983 by the Israeli Defense Forces.

Present aquifers can scarcely meet [Israel's] current needs or greater levels of consumption much beyond 1990.

In interviews, Technology Minister Neeman, a brilliant physicist from the far-right Techiya Party who has vowed to work for the "sharing" of Litani water with Lebanon, freely acknowledged Israel's long interest in Litani water. And he confirmed that seismic soundings and surveys had been conducted at a spot on the Litani gorges called Deir Mimas—soundings that Lebanese Litani River Authority officials were certain had been undertaken to find the optimum place for the inlet of a diversion tunnel to be dug about three miles into Israel.

Norwegian officers and soldiers of the U.N.'s Lebanon force have described how, in January 1983, an Israeli military bulldozer cut a steep road into the face of the rocky gorge below Deir Mimas. An engineering party then inserted rods into the rock outcroppings to take the soundings. In investigating these reports ABC News teams and other reporters in southern Lebanon encountered Israeli land survey parties taking measurements on the hills and hairpin turns of the roads near the Litani. The Israelis may simply be planning new military roads or improving topographical maps. A number of Israeli families in the

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Metullah area, however, hold deeds or other claims to land in southern Lebanon—just as Lebanese still hold similar claims to land south of the border in Israel. Should Israel decide to go ahead with the Litani plan, this Israeli-claimed land could be used for the artificial lake or reservoir or other irrigation works.

Neeman contended that such diversion tunnels might have been interesting when the Cotton plan and other earlier schemes were proposed in the past, but no longer. Neeman relates that when Sharon, his political ally, returned from the Lebanon campaign, Neeman asked, "What do you think about the Litani?" "The Litani?" Sharon allegedly responded, "Have you seen the Litani? It's only a trickle, not worth the taking." This meager flow, acknowledged Neeman, results from the intensive Lebanese power and irrigation projects upstream. Neeman added, however, if the Lebanese ever cared to sell some of the Litani water, "We would be glad to buy this little water and make good use of it in northern Galilee."

Lebanese water engineers estimate that an Israeli downstream diversion effort could cost the Litani at least 3.5 billion cubic feet annually. This loss would rule out effective irrigation of the southern Lebanon panhandle and would ultimately turn much of the region into a desert. Moreover, diversion, at least under schemes advanced in 1943 and 1954, would also require Israel to stay on in Lebanon and hold at least the entire Bekaa Valley south of the Damascus road in order to control the river's flow, to pre-empt Lebanon's use of the water to irrigate the panhandle if it regains the region, and to protect the diversion system from any Syrian counterattack. Any long-term harnessing by Israel of Lebanon's water resources would also require control of both slopes of the Lebanon mountain range. Otherwise, enemy spotters in the Shuf Mountains to the west, where the Israelis have upgraded and now operate a long-range radar station at Dar Barouk, could direct artillery fire or air strikes on diversion projects.

Israelis avoid public discussion of the sensitive subject of water resources. Never once did the Litani question come up during all of the

Israeli-U.S.-Lebanese talks leading to the May 1, 1983, troop withdrawal agreement, even though the Lebanese were prepared to discuss the matter had it been raised by the Israelis. The Saudis have privately assured Lebanon that they would fully finance irrigation of the area south of the Litani, if the United States could provide a guaranteed date for Israeli withdrawal.

Israel's own water needs have been rising rapidly. Recent Israeli Water Administration statistics show that from 1948 to 1978 Israel's cultivated area increased at a slower rate than population. Yet 900,000 additional acres remain potentially available for irrigated agriculture, while 400,000 more acres are potentially suitable for dry farming. Upon considering that Israel's efficient farming methods require 100,000 cubic feet of water each year for the average acre of irrigated land, Israel's great need for water becomes clear.

Moreover, Israeli planners privately admit that unless the country concentrates purely on expensive desalination plants, or finds a way to increase substantially the present recycling of used irrigation and waste water, present aquifers can scarcely meet the country's current needs or greater levels of consumption much beyond 1990. Another major water source will be needed. The hydraulic imperative, from the Israeli point of view, is capturing either the Litani or a much greater share of the Yarmuk. Whether Israel moves unilaterally or whether the region returns to the Eisenhower-Johnston concepts of finding ways to share the Earth's most precious resource for the common good, will help determine the future political geography of the Middle East.

A New Agenda

Only the United States is in a position to persuade the regional states to return to the ideas of planned water sharing and joint water development as part of any really practical peace package. But President Ronald Reagan's thus far totally ineffective Middle East peace initiative is inadequate to the task; inexplicably, it simply assumed Israeli willingness to halt new settlements on the West Bank and

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Israeli and Syrian willingness to withdraw from bleeding Lebanon. The plan should be completely revised to include renewed attention to both land and water resources.

To reassure the Palestinians who remain on the West Bank that Israel does not plan to expel them to East Jordan, despite Sharon's proclaimed belief that "Jordan is Palestine," Israel should permit them to use their own wells and other water resources again. If Israeli planners are truly convinced that Israel cannot survive without use of some Litani or Yarmuk water, or both, then they should say so out loud and propose ways of developing available water resources for the benefit of all riparian states.

A public declaration that Israel does not plan unilateral diversion or seizure of Litani, Orontes, or other "Arab" water might help, if it were matched by reciprocal Arab assurances to Israel and guaranteed as part of a larger peace package endorsed by the United States and by as many other major powers as possible. The United States should make it clear that it will not tolerate new military campaigns by Israel, or anyone else, to seize additional land or other resources. It should stand firmly behind Lebanon's plans to finish development of Litani water resources within the borders of a sovereign, independent Lebanese state from which all foreign troops have been withdrawn. It should impress upon all concerned that completion of Israel's Med-Dead saltwater canal without prior direct or U.S.-mediated discussion with Jordan is just as likely to spark a new conflict as the seizure of the Yarmuk site. With the World Bank and other interested organizations and governments, Washington should revive and press for completion of the Yarmuk project, including construction of the long-delayed Maqarin Dam in consultation with Israel, Jordan, and Syria. This agenda is a great deal to ask of an administration concerned with winning the pro-Israel vote to re-elect a president already deeply mired in Lebanon. But these steps could also prove to be the bare minimum required to head off a new war over Mideast resources—a war that would be the most destructive yet seen.