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Tigris & Euphrates

Iraq's Vital Rivers of Antiquity

"There was a river flowing out of Eden to water the garden, and leaving there it divided into four branches; ... the name of the third river, the Tigris ...; and the name of the fourth river, the Euphrates." (Genesis 2:10, 2:14)

Meandering through Iraq for 7000 years, the Tigris and Euphrates have fertilized a sterile land—and breaching their banks without warning, have swamped their fruits. The existence of modern Iraq is still at the mercy of the twin rivers that watered the Garden of Eden and nurtured the ancient civilizations of Mesopotamia, the "land between the rivers."

Originating in the mountains of Turkey and Iran, the Euphrates today flows southwestwardly through Iraq, while the Tigris winds in a southeastward direction. The two rivers meet at al-Qurna and form the Shatt-al-Arab, which flows into the head of the Arab Gulf. Throughout history, the twin rivers have occasionally changed their courses, and at one time they entered the Gulf in separate channels.

Until the early 1950's, archaeologists believed that in ancient times the Arab Gulf extended as far north as Baghdad, and that the Mesopotamian delta was gradually formed as the Tigris and Euphrates deposited silt carried from the mountains. However, shells indicating a fresh-water fauna have been found northwest of the present Gulf shore line, and archaeologists have concluded that even part of the Arab Gulf was once land.

The first inhabitants drifted into Mesopotamia sometime between 5000 and 4000 B.C. These initial migrants were hunters from Western Asia who turned to agriculture as their chief means of survival. Since their homeland was an arid country, they crossed into Mesopotamia and concentrated on the banks of the Tigris and Euphrates. Though these early farmers were not Sumerian, the Sumerians were undoubtedly responsible for urbanizing the area sometime between 4000 and 3000 B.C. Most of the words pertaining to city life are Sumerian, whereas the words for farming techniques and products are not. The origin of the Sumerians is unknown; their language cannot be linked to any known family of languages.

Urbanization was spurred by the need to build and maintain an intricate system of canals in lower Mesopotamia. These canals drained the marshes, ensured water for irrigation and protected the

country from ravaging floods.

Sir William Willcocks, a British engineer who worked on Iraqi irrigation problems at the beginning of the 20th century, has said:

"The lessons of order and method are taught so thoroughly by irrigation that it is not surprising that all the ancient civilizations of the world had their birth in the irrigated valleys of the great old-world rivers. Uncivilized men could live in woods, and partially civilized ones in desert oases, but to exist in a country needing irrigation men had to be disciplined and to be amenable to laws and regulations. When hundreds and thousands of families had at first to learn the laws of nature, then apply them, and then live in accord with one another, in order to ensure the irrigation and drainage of their individual holdings, true civilization took its birth."

A host of city-states arose in Sumer, the area of lower Mesopotamia: Nippur, the most important because it was the home of the god Enlil, from which all the cities ultimately derived their power; Eridu, believed by some archaeologists to be the first city to emerge from Noah's Flood; Ur, the home of Abraham and the place from which he set out for Canaan. Others were Uruk, Lagash, Umma, Kish, Shuruppak, Isin and Larsa.

The Sumerians were skillful farmers who took advantage of the fertile soil and water supply. They built canals to irrigate their land and to control the tumultuous rivers. During this time, the Tigris was flowing in a more westerly channel, closer in its lower course to the Euphrates. The Sumerians took advantage of this and built canals from the one river to the other. Where the Euphrates was flowing at a higher level than

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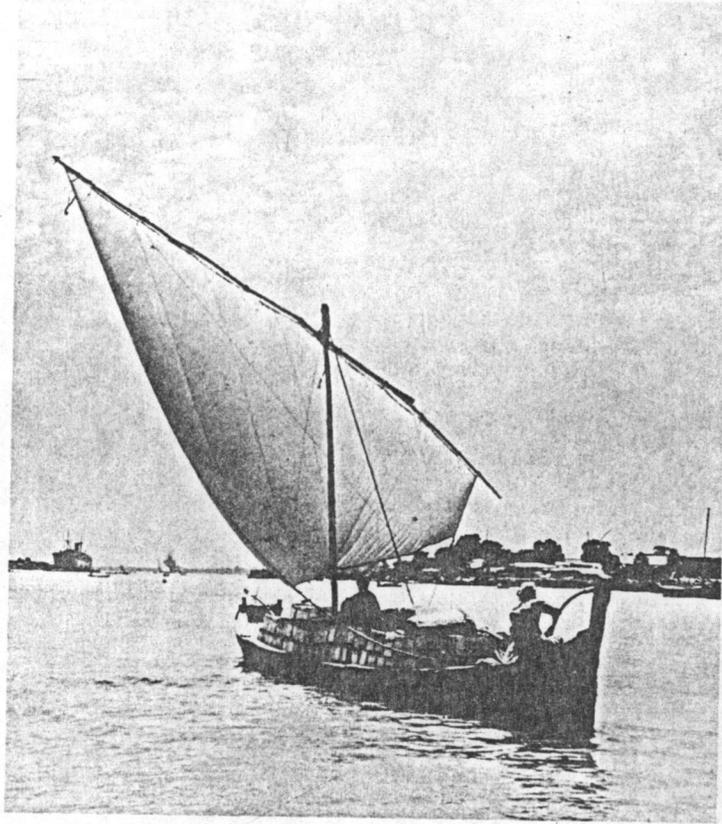
the Tigris, they drained the water of the first river into the second. Where the Tigris flowed higher than the Euphrates, they reversed the process. Canals were also built between cities, such as the one that connected Eridu and Lagash. Today, the entire area is threaded and crisscrossed with the remains of ancient waterways.

Some archaeologists date Noah's Flood to the Sumerian Era, sometime between 3800 and 3500 B.C. They believe the Flood was not merely one flood, but many, caused by an unusually turbulent rising of the Tigris and Euphrates, and augmented by torrential rains. Flooding of the twin rivers is a continual menace, and there are two distinct flood periods: one from the end of November to the end of March; the other from the end of March to the end of May. Floods in the first period are due mainly to rain and, as the rainfall in the area is slight, are not dangerous. Floodings in the second period are much more perilous, since they are caused by the melting snows in the mountains of Turkey and Iran with the coming of warm weather. That modern Iraq is cognizant of the need for flood control is witnessed by the construction of the Habbaniyah Project on the Euphrates and the Tharthar Project on the Tigris, both completed in 1956. And it was in 1956 that the Tharthar Project saved Baghdad and its inhabitants from the dangers of ravaging floods.

The Sumerian civilization began to decline shortly after 3000 B.C., but it had already laid the foundation for all future civilizations that burgeoned in the fertile valley of the Tigris and Euphrates. To the empires that followed, the Sumerians bequeathed not only the rudiments of a successful irrigation system, but the arts of writing, astronomy, mathematics and astrology.

Following in the footsteps of the Sumerians were a Semitic people who assumedly migrated to Mesopotamia from the Arabian desert. Their capital was Agade, located in the middle of Mesopotamia where the Tigris and Euphrates are closest to each other, and they were called Akkadians. The Akkadians intermarried with the Sumerians and assimilated their culture. Under the reign of King Sargon I, from 2350 to 2300 B.C., the Akkadian Empire reached its zenith. Agade was a thriving commercial center to which ships brought riches from all over the civilized world across the Arab Gulf and up the Euphrates.

Several centuries after the reign of Sargon I, a western Semitic people called the Amorites dominated Mesopotamia. Their capital was Babylon, located on the Euphrates just below Agade; and their empire, Babylonia, extended across the southern plain of Mesopotamia. Agriculture and a successful irrigation system played a vital role in the Babylonian Empire; this is proven by the Code of Hammurabi, the sixth king of Baby-



An Arab boat on the Shatt al-Arab.

lonia. According to the Code, those persons who failed to cultivate their fields were penalized, as were those who neglected the canals and dikes.

"If a man has neglected to strengthen his bank and a breach has opened out itself in his bank, and the waters have carried away the meadow, the man in whose bank the breach has been opened shall render back the corn which he has caused to be lost," the Code reads.

While Babylonia flourished along the southern and middle Euphrates, the first buds of the Assyrian Empire, established by another Semitic people, were flowering along the upper Tigris. Around 2000 B.C., however, Babylonia annexed Assyria; and several centuries later, a tribe of invaders called the Kassites conquered the entire Babylonian Empire. Archaeologists believe that the Kassites came from east of the Tigris since their language was neither Indo-European nor Semitic. For 600 years, Babylonia and Assyria declined under the Kassite domination.

During the 12th century B.C., Assyria regained its power, overthrew the Kassites and conquered the whole of Mesopotamia. Although the Assyrians were preoccupied with the arts of warfare (their empire was built on military despotism), they too recognized the need for land development and river control. King Tiglath-Pileser, who ruled at the end of 1200 B.C., imported cedars from neighboring countries and planted them in the northern regions of Iraq where his capital lay. And in the city of Kalakh, two great barrages were erected that

still effectively block the Tigris. Under the reign of Sargon II, from 722 to 705 B.C., the Assyrian Empire attained the height of its power and supremacy. Sargon moved the capital from Ashur to Kalakh, and finally to Nineveh, which is located on the west side of the Tigris across from the modern city of Mosul. He was followed by Sennacherib, Esarhaddon and Assurbanipal. From the library of King Assurbanipal, 22,000 tablets have been recovered containing works on science, history, mathematics and royal administration. Between 612 and 606 B.C., the Assyrian Empire was toppled by the combined forces of the Medes, Persians and inhabitants of ancient Babylonia.

With the fall of Assyria, the Babylonians regained control of Mesopotamia. This was the time of the new Babylonia, the era of Nebuchadnezzar and his notorious city, Babylon. The renowned Hanging Gardens were built by Nebuchadnezzar for his Median wife, Amytas, so that she would not miss her mountain home. More than one hundred feet tall and occupying three and a half acres of land, the Gardens consisted of trees and flora gathered from every corner of the empire. They were nourished by a continuous water supply pumped from the Euphrates. Besides the Gardens, Nebuchadnezzar built a drawbridge across the Euphrates. Connecting the city, which flourished on both sides of the river, it was the first stone bridge known to man. The new Babylonia was indeed a period of prosperity and restoration. The silt was cleaned from the Euphrates,

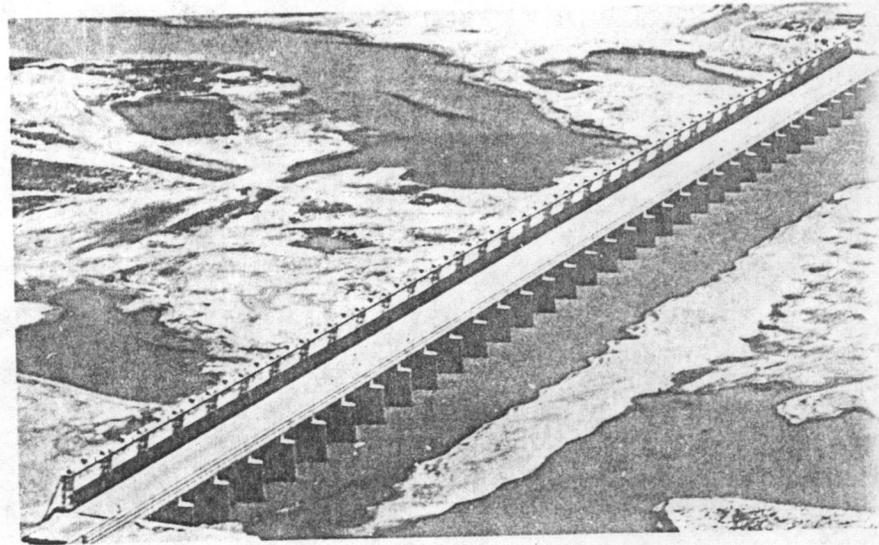
the canals were reconstructed and a thriving agriculture blossomed again in lower Mesopotamia.

But the "writing was on the wall," and the splendor of Nebuchadnezzar's Babylon was short-lived. Cyrus the Great sacked the city in 539 B.C., and in the following year, Babylon fell to the Persian conqueror. For a thousand years after, a succession of Persian and Greek rulers dominated Mesopotamia, but the agriculture and irrigation systems still thrived.

Instead of destroying Babylon, Cyrus admired it so much that he made the city his winter capital, and under his and his successors' rule, the country continued to prosper. Not only did Cyrus maintain and improve the existing waterways, but he put his army to work digging new canals, one of which is the present Khorassan Canal on the Diyala, a Tigris tributary.

Herodotus, the Greek historian, traveling through the country in the 5th century B.C., wrote, "The whole of Babylonia is like Egypt, intersected with canals." And referring to the Nahr Melcha, constructed under Nebuchadnezzar, he said, "The largest of them all, which runs towards the winter sun, and is impassable except in boats, is carried from the Euphrates, into another stream, called the Tigris, the river upon which the town of Nineveh stood."

Of the agriculture, Herodotus wrote, "It is so fruitful as to yield commonly two-hundred fold, and when the production is the greatest, even three-hundred fold. The blade of the wheat-plant and barley-plant is often four fingers in breadth. As for the millet and the sesame, I shall not say to what height they grow, though within my own knowl-



An aerial view of the Tharthar Project on the Tigris, which in 1956 saved Baghdad from ravaging floods.

edge; for I am not ignorant that what I have already written concerning the fruitfulness of Babylonia must seem incredible to those who have never visited the country."

When Alexander the Great captured Babylon in 331 B.C., the Persian rule was changed to Greek. Like Cyrus before him, the Grecian conqueror was captivated by the beauty of Babylon, and he made the city capital of his Eastern territories. Alexander also put his army to work, cleaning the canals and rivers, and reclaiming the Babylonian marsh areas, where it is believed he contracted his fatal malarial disease. During Alexander's rule, the whole of

the Tigris and Euphrates were used for irrigation.

After Alexander's death in 323 B.C., his empire was divided among his generals. Mesopotamia fell to Seleucus, who built his own capital, Seleucia, on the western bank of the Tigris below Baghdad.

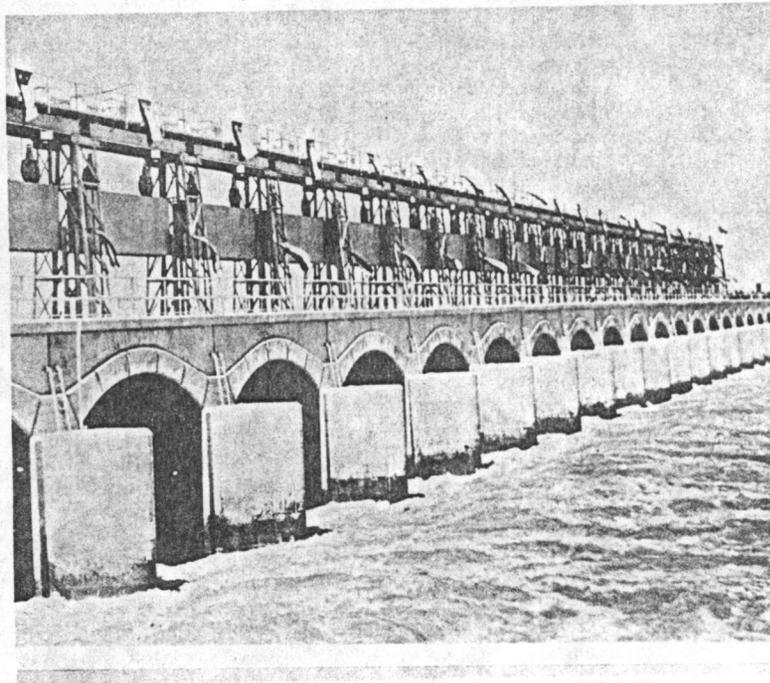
Meanwhile, a renewed nationalism was growing in Persia, and in 140 B.C. the Parthian Persians toppled the Greek Seleucid dynasty. They built their capital at Ctesiphon on the eastern bank of the Tigris opposite Seleucia.

In 226 A.D., the Sassanian Persian overcame the Parthians. During the reigns of the Sassanian kings, the Mesopotamian delta probably saw some of its most productive days. The Nahrwan Canal, which spanned the right bank of the Tigris, irrigated all the country east of the river; while the Dujayl and Ishak Canals on the left bank irrigated the country to the west. Four ancient canals were restored: the Isa, Sarsar, al-Ma'ad, and Kutha. Taking water from the Euphrates, they irrigated the areas lying between the two rivers.

Enduring for more than four centuries, this prosperous period under the Sassanians was doomed to end. In the early part of the 7th century A.D., a series of devastating floods destroyed the embankments and dams, and the river swamped the country, turning the fertile lowlands into a quagmire of sea-level marsh. The flood led the way for Arab victory in their war against the Sassanians, and in 637 A.D., the Arabs occupied the Mesopotamian valley.

One of the most brilliant chapters in the history of Mesopotamia was written by the Abbasid caliphate. Their cities were Kufah, Wasit, Basrah, Samarra and finally the round city of Baghdad, which became the seat of the caliphate at

Waters of the Euphrates surging through the Habbaniyah Project.



later the capital of Iraq. Construction began on Baghdad in 762 A.D. under the second Abbasid caliph al-Mansur. But it was during the time of Harun al-Rashid (786 to 806 A.D.) and his successor al-Ma'mun that Baghdad and Mesopotamia saw their most glorious days.

While Western Europe stagnated in the Dark Ages, Baghdad flourished in a spiritual and intellectual utopia, attracting learned men from all over the civilized world, and rivaling the Byzantine Empire. Dar al-Hikmah, founded by al-Ma'mun, functioned as academy, museum, library and bureau of translation. A hospital was established where diseases were treated and prescriptions filled by trained physicians and pharmacists. Bazaars lined the streets displaying the riches of China, India, Syria and Egypt. Outside the city, farmers were encouraged to cultivate their land, canals were remodeled and a large area of the land submerged by the floods of the 7th century were reclaimed. The delta saw its most fruitful days and Arab towns sprouted up and down the Tigris. The Arabs maintained the Nahrawan Canal system, and remodeled the Isa, Sarsar, al-Malik and Kutha Canals. The Isa linked the Euphrates and Tigris, and its distributaries fertilized the area west of Baghdad.

With the Mongol invasions of the thirteenth and fourteenth centuries, not only was the Baghdad caliphate destroyed, but the final blow was struck against the irrigation systems of the country. Hulagu Khan and his Mongol invaders wantonly destroyed, again and again, the dikes and headworks, letting loose the rivers to flood the land. The long period of Turkish rule that followed only worsened the damage done by Hulagu and his invaders. For more than 600 years, Mesopotamia—"the cradle of civilization"—remained a waste.

In 1908, with the advent of the Young Turks, signs of re-establishing the irrigation systems became apparent. In that year, the Turkish government called on Sir William Willcocks to report on agricultural potentialities in Iraq. Sir William submitted a report in 1911, and upon his recommendations, the Hindiyah Barrage and the Habbaniyah Project were begun on the Euphrates. The first was completed before World War I, and modernized by the British between 1921 and 1925. The second was abandoned during the war, begun and abandoned again in 1939, and finally completed in 1956.

At the close of World War I, Iraq found herself freed from Turkish rule only to be declared a British mandate in 1920. Since her independence in 1932, Iraq has been experiencing the "growing pains" encountered by all new nations. Under such conditions, internal improvements are difficult to bring about all at once, and advancements in irrigation and flood control are no exceptions. But



Harvesting dates in Iraq.

Iraqi irrigation experts recognize that the country's very existence is contingent upon successful utilization and control of the Tigris and Euphrates, a fact often hidden by the wealth of Iraqi oil deposits. Water from the twin rivers and fertile soil must be placed next to oil as Iraq's most important resources. From these two elements come productive farming, electricity and natural gas.

More than two thirds of Iraq's people depend on the soil for their livelihood, and most of the country's exports are produced from farming. Iraq produces 80% of the world's date supply, which is second only to oil as the country's main source of revenue. Other crops are barley, wheat, lentils, vetch, linseed, tobacco, rice and sesame.

Successful farming in turn depends on irrigation, especially in southern Iraq where the rainfall averages only a few inches a year. One of the first irrigation projects constructed by the new Republic of Iraq was the Kut Barrage on the Tigris. Completed and opened by King Ghazi in 1939, it ensures the irrigation of 900,000 acres of land through the Gharraf Canal. Interestingly, the course of the modern Gharraf is identical to the course of the main Tigris channel during the Islamic era more than 1,000 years ago.

Since 1950, Iraq has initiated several government-sponsored development programs. The 1955-1961 plan was concerned mainly with irrigation and flood control, and from a \$1.4 billion budget, \$430.6 million was used for these purposes.

Presently under construction is a dam on the Tigris, 35 miles north of Mosul. Upon completion, it will be the fifth largest dam in the world, and will have cost about \$211 million. The man-made lake created by the dam will be used to irrigate 2,250,000 acres of land lying across the Tigris. It will also act as a regulator to prevent flood damage. In a later phase, a power plant will be constructed at the dam site.

With the Habbaniyah Project on the Euphrates, the Tharthar on the Tigris, the Dokan Dam on the Lesser Zab River, and the Derbendi Khan on the Diyala (the latter two rivers are tributaries of the Tigris), sufficient security is provided against ravaging floods in modern Iraq. Full utilization of the Tigris and Euphrates by means of the existing dams and reservoirs, together with those under construction and consideration, will double the area of cultivated land in Iraq, adding 4,500,000 acres to those already under cultivation.

—EVELYN PODSIADLO

Boxes of dates on their way to the four corners of the world.

