ARAMCO WORLD
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CSF

Time of the Hundred Men

time of the Brussels sprouts or the time of the great cattle drives. For in the midst of shortages of every kind, the free-handed ingenuity of many of the hundred men and the astonishing fortitude of an elderly Bedouin provided some remarkable, and funny, adventures.

For instance, the truck farm that bloomed in the desert like a rose on the dunes. This verdant oasis was the camp's answer to canned Brussels sprouts.

Food supplies might fall off. Months might pass without a single freighter arriving with mail or provisions. But from some secret horn of plenty, Brussels sprouts turned up on the dining hall menu day after day. The hundred men were sure that Steve Furman, the commissary chief, had an entire warehouse stacked to the roof with the little green vegetable.

The sprouts wore more disguises than a movie spy. They lurked in soup and salad. They turned up as stew and garnish. There are those who insist to this day that they can remember eating Brussels sprouts waffles.

Finally the truck garden was started. Plows were devised and ground was leveled and furrowed. The Dhahran victory garden soon began to yield tomatoes, cucumbers, lima beans, carrots, onions, sweet corn and other crops.

The next commissary project — a livestock farm and cattle ranch — was started to assuage the natural hunger of the American for meat. Steve Furman, apparently a cattleman at heart, bought rabbits, chickens, pigeons, goats, camels and cattle. All came from local sources. All were of the sinewy breeds that had adapted to the country's limited forage.

Then, in the winter of 1941-1942, a Saudi Arab known only as Mutlag — an old man, wizened, proud and tough — offered to bring a herd of cattle up from Yemen. The proposition was incredible. It meant driving the herd around the edge of the world's largest sand desert, across desert steppes and hardpan on a diagonal of more than a thousand miles.

Mutlag started in January from the mountains of Yemen. By slow stages he slogged along on his epic drive from well to well, from forage patch to forage patch, with only the help of a half-grown boy.

After weeks of slow progress the cattle bellowed into al-Kharj, an oasis south of Riyadh watered by brimming wells. Mutlag then turned east. The last leg, from the oasis at Hofuf to Dhahran, was the driest and most difficult. The cattle were little more than bones held together by hide when they got to "Furman's Ranch."

The old Bedouin, a man of fierce pride, had come through. Americans who knew the tales of the Chisholm and Bozeman trails were awed by what Mutlag had done. An old man and a boy — on foot.

Two winters later Mutlag went back to Yemen for another 200 head of cattle. But a severe drought had dried up the wells and burned out the forage. Dozens of the cattle died before Mutlag got them into al-Kharj. At that time some of the Dhahran engineers were in al-Kharj assisting the Saudi Arabian Government on an agricultural project. One of the engineers, Burt Beverly, radioed Furman that if he wanted any *live* cattle, he'd better come and truck 'em in.

Only about 30 cattle survived the second drive. For a long while Mutlag didn't even come to collect his money.

By that time Furman, with an eye to fattening up his stringy but growing herd, had managed a deal with an Arabian Gulf dhow captain. The sailor smuggled a bull out of Iraq, and not many months later Furman was able to boast some 1,000-pound steers. Quite an improvement over the previous 350-pounders.

The ranch also developed a dairy herd of 35 cows that supplied milk not only to the whole camp but also to American aircraft crews of the Persian Gulf Command who learned to miss their official landing point on Bahrain in favor of the makeshift airstrip at Dhahran. All such "emergency" landings led straight to a cold glass of pasteurized milk.

By late 1944 the tide had turned. Allied victory seemed assured. The time of the hundred men was nearing its end. The men could look back on many solid accomplishments.

For example, progress had been made in cooperation with Saudi Arab officials in the difficult day-to-day effort to control malaria. The al-Kharj irrigation-reclamation project conceived by Shaikh Abdullah Sulaiman had been carried forward with the help of company engineers. Further, 1940 to 1944 saw the greatest advance yet made by the Arabian American Oil Company in its education and training program for thousands of Saudi Arab employees.

In mid-November 1944, seven Aramco wives in various parts of the United States got telephone calls asking them if they could be ready to leave for Saudi Arabia in a week. After an extraordinary journey they arrived in Dhahran just ahead of St. Valentine's Day, 1945. It was time for family life to begin again.

The C-47 that brought the seven wives back to Dhahran landed after dark by the light of smoky red flares, right on target. But the pilot, fearing he might roll into the Persian Gulf, slammed down hard on his brakes. His deep skid marks drew a line between the time of the hundred men and the great years ahead.

The "bunkhouse" days were over. The time was past when a simple wedding ceremony would gather up the lonely outpost in its embrace of memory and promise. ■

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OIL STAMPS

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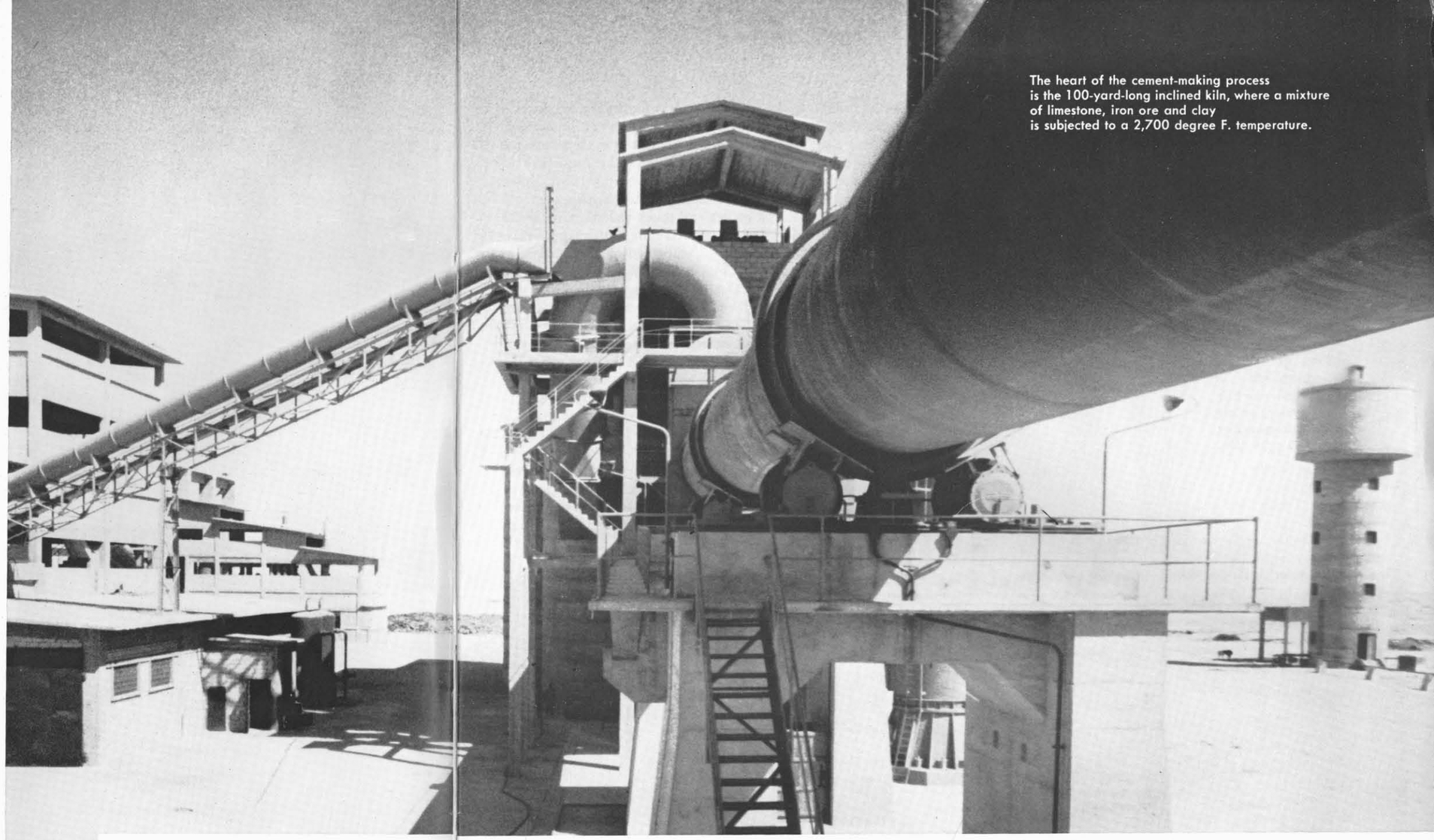


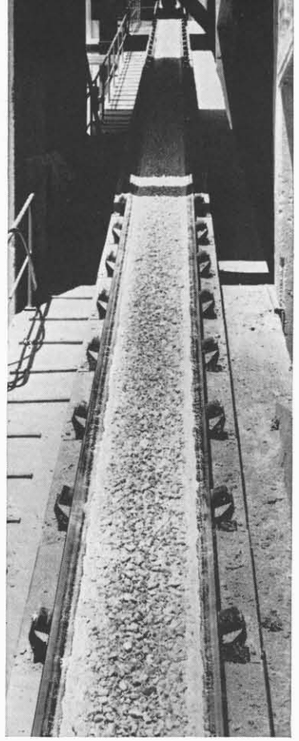
The heart of the cement-making process is the 100-yard-long inclined kiln, where a mixture of limestone, iron ore and clay is subjected to a 2,700 degree F. temperature.

The rapid business development in Saudi Arabia is reflected by the growth of the Saudi Cement Company, Aramco's first large-scale customer for natural gas

SAUDI CEMENT

IN THE SPRING OF 1962 the temper of economic development in Saudi Arabia was decidedly optimistic. Day after day explosives boomed in the stone-ribbed mountains not far from the Holy City of Mecca. Almost as soon as the air cleared, big grading machines moved through the debris followed by asphalt spreaders laying down a black ribbon

SAUDI CEMENT



Conveyor belt carrying limestone pellets away from crusher looks like giant slide.

of new highway in the nation's growing transport network.

About 50 miles to the west, in the heart of Jiddah, the ancient Red Sea trading center, bulldozers drove two broad swathes through the labyrinthine "old city" to make way for new intersecting thoroughfares.

In a quiet office, out of hearing of the crunching demolition, a banker stirred his tea and told a visitor: "One of the outstanding new industrial projects now being planned here is a detergents manufacturing plant. It is being financed in part by a group of Saudi Arab merchants. It seems to me that this project demonstrates a growing trend in which successful merchants are reinvesting their profits in new Saudi Arab enterprises."

Driving through the streets of Jiddah, the visitor was impressed – as he had already been in al-Khobar on the Persian Gulf and in Riyadh, the national capital – by the great number of buildings under construction. Tons of concrete flowed daily into sturdy construction forms made of weathered planking.

Eight hundred miles across the country in the Eastern Province, Arabia's "oil country," Saudi importers were encouraged to build up warehouse inventories and to expand into new fields of goods and materials by the continued growth of the Arabian American Oil Company's local purchases. In 1961 Aramco spent $11,277,000 for supplies through Saudi Arabian sources, twice the amount spent during the previous year.

The vast raw materials storage hall of the Saudi Cement Company where crushed limestone, clay, iron ore and gypsum are piled before processing.

In the mountains of 'Asir preliminary survey work was being carried forward for an unusual system of dams. United Nations experts in co-operation with the Saudi Arabian Government have drawn up a scheme for capturing the sizeable volume of runoff water that cascades away after a rainfall in the high coastal range.

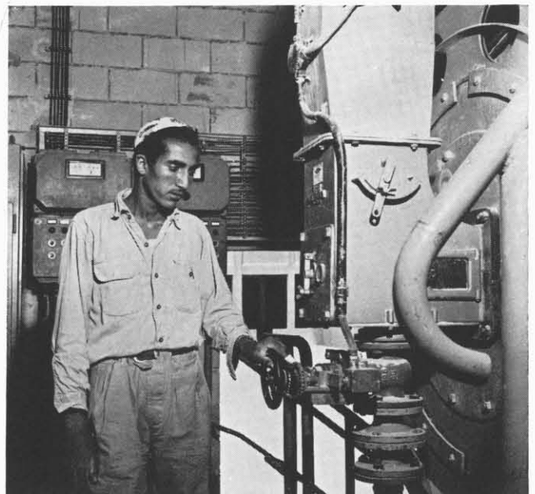
Planning was in the air, not only for the 'Asir dam project but also for broad-gauge industrial expansion. In a report touching on the country's economic potentialities, *The New York Times* stated that the Saudi Arabian Government had retained Oliver H. Folk, formerly loan officer of the International Bank for Reconstruction and Development, as a special adviser to its Supreme Planning Board.

"On the industrial side," the *Times* added, "Robert L. Garner, former head of the International Finance Corporation, an affiliate of the World Bank, has been invited to see what he can do to bring enterprises with established markets and technical 'know-how' to Saudi Arabia."

The general air of optimism, however, was not confined only to those men with their eyes on the future. Early in the spring the board of directors of the Saudi Cement Company took a hard look at the country's booming construction program and voted to double the capacity of the company's brand-new plant. What gave the decision a slightly unusual twist was the fact that the plant was so new it hadn't even completed its break-in phase of operations.

Closely checked figures reflect progress of cement manufacture.

A technician controls temperature of gas burner in drying unit.



This ultramodern facility was designed by British civil engineers so that an increase from 300 to 600-tons-per-day production could be accomplished with minimum new construction to accommodate added German processing units. The Saudi directors found straws aplenty in the wind to guide this proposed expansion. For instance, national imports of cement were averaging 1,200 tons per day at the beginning of the second quarter of 1962. In April alone, a record month, 80,000 tons of cement were unloaded at Dammam, Saudi Arabia's second largest port. An already substantial market for "Saudi Cement" (the company's brand name) was expanding rapidly.

The quick success of the Saudi Cement Company is the result of careful planning and sound economic strategy. The company appears to be a model of economic fitness. Everything about the operation seems "right." It would be hard to find a better example of the right raw material (native limestone that tests 98 per cent calcium carbonate), at the right place (close to an abundant supply of energy and to growing cities and industries), in the right quantity (a minimum 500-year supply), and one that is being developed at the right time (coincident with the Saudi building boom).

Limestone, iron ore and clay are used in manufacturing cement. Gypsum is added as a control agent. The company quarries its limestone on its own property about 500 meters from the plant fence. The clay is quarried 14 kilometers from the plant on a rail spur. The iron ore comes 400 kilometers by truck, the gypsum 200 kilometers. Thus the raw materials are fairly close at hand – the principal raw material, limestone (about 84 per cent of the cement), is practically in the plant yard.

There is still another aspect of the plant's self-sufficiency that has caused the Saudi Cement Company to be of considerable interest to the country's economic strategists. The fuel for its huge kiln is piped in from a mere 11 kilometers away. The fuel is clean, requires no investment in storage facilities and is readily available. Further, it costs little and there is no danger of a shortage. This ideal energy source is natural gas.

With every barrel of crude oil produced in the country, some associated natural gas is produced. Once it has come to the surface, the gas has to be separated from the oil. Thus there is a substantial supply of oil-associated natural gas available for industrial energy or for use in making vital petrochemicals.

If one stands at the top of the Saudi Cement Company's "raw materials storage hall," one can see a slender pipeline stretch away from the plant across the desert and disappear in a rise of limestone hills. This eight-inch-diameter line is assured a permanent place in the economic history of Saudi Arabia, for it carries the first natural gas purchased by a major Saudi Arabian industrial enterprise. The slender pipe marks a threshold beyond which lies great potential use of

At a quarry nearby the cement factory, a compressed air drill prepares holes for the explosive charges that loosen limestone.

SAUDI CEMENT

this copious, low-cost energy source.

The line extends from Aramco's Shedgum Gas-Oil Separator Plant Number 1 to the cement plant, where the gas is used principally in the kiln. At present the Saudi Cement Company consumes about 1.5 million cubic feet of gas a day, a figure that will be doubled when a second kiln is added next year as part of the expansion program.

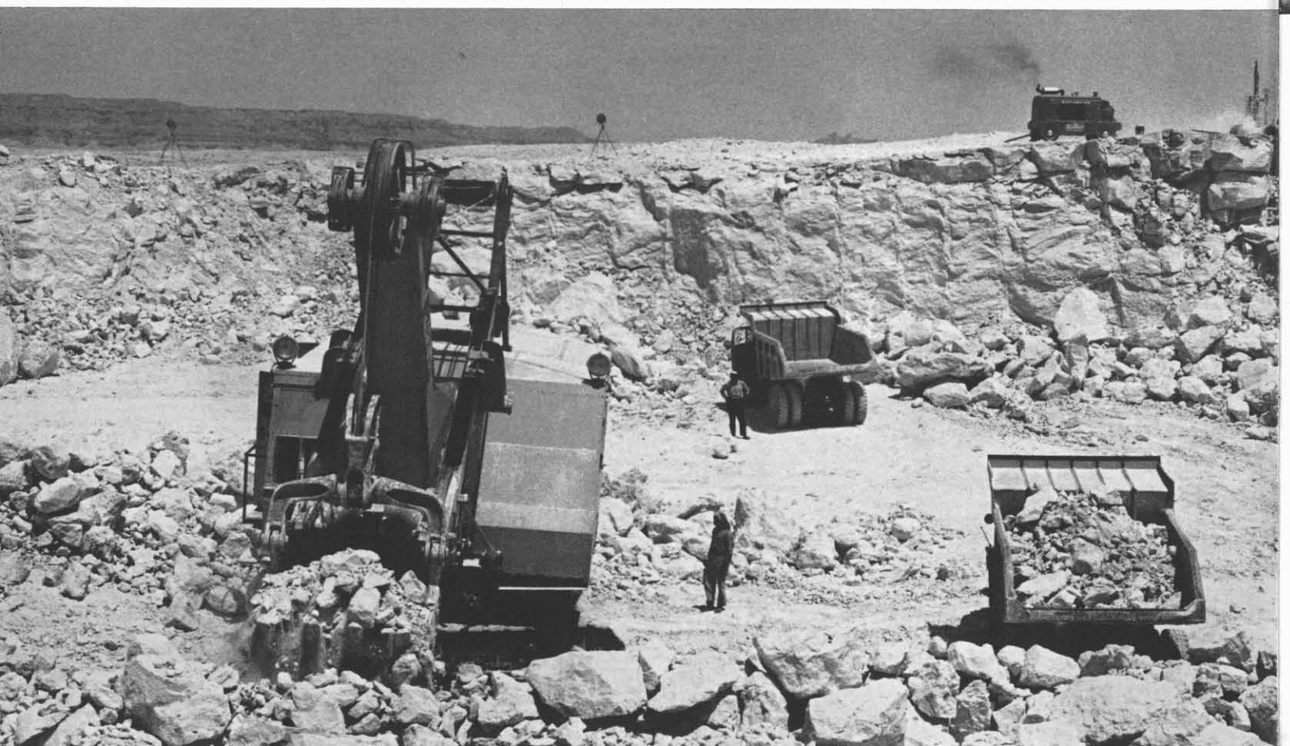
The kiln is the heart of the cement-making process. It is 90 meters long and 3.2 meters in diameter. Looking like a great toppled smokestack, it rotates on its side on a 13-degree incline. Its steel shell is lined with firebrick which refracts the heat generated by the burning gas. In the "sintering zone," where the finely milled mixture of limestone, iron ore and clay is subject to chemical reactions, the temperature reaches 2,700 degrees F. The aim of the sintering procedure is to create a "clinker"—tricalcium silicate. This is cement. The clinkers are cooled and milled, and gypsum is added to control the rate at which the cement will set when it is used.

The company imports the bags in which the finished cement is packed, a practice it plans to continue until such time as the local manufacture of bags becomes economical. That time will come when the Saudi Cement Company and another cement company in Riyadh can, between them, use the minimum economic production of a Saudi Arabian bag factory.

In the spring of 1962 the Saudi Cement Company became, along with the Saudi Arab Government Railroad, several independent contractors and, of course, the Arabian American Oil Company, one of the largest employers in Arabian industry. It had 320 people on its payroll, 85 per cent of whom were Saudi Arabs. The shops, quarries and work shifts are supervised by Germans.

Across the highway from the plant there is a company compound where employee housing is provided: ten houses for the married senior staff, 30 rooms for bachelor intermediate staff and quarters for 80 general staff laborers. Most of the shift employees live 35 kilometers away in Hofuf. Expansion plans call for more housing to be built to bring a greater number of shift workers close to the plant and cut down the time they now spend in transit. A canteen-dining hall is provided for the senior and intermediate staff residents, and a separate menu is available for curry-loving Pakistani employees.

A 100-ton power shovel bites into the blast-loosened limestone, which is 98 per cent calcium carbonate and ideal for cement manufacture.



Another ingredient of cement, iron ore, comes from mine at Riyadh, the nation's capital. Engineer Muhammad Hossary examines sample.

Shaikh Ahmad Juffali, one of the country's best-known businessmen, is the managing director of the company. The first discussions toward forming the company were held by the investor group about nine years ago. In 1954 German consultants were brought to Saudi Arabia to determine an ideal location for a cement plant. Their nine-month study led them to the site near Hofuf.

During the next several years the plant was engineered and the processing units were fabricated in Germany. In July 1958 the civil construction started, and on the first day of 1960 initial equipment was moved into place. Test production began in October 1961.

In the spring of 1962 it would have been difficult to find a Saudi Arabian industrial enterprise more in keeping with the temper of the times than the Saudi Cement Company. The break-in phase of production was nearing its close, and the German engineering representatives of the equipment manufacturer were nearly ready to turn the plant over to its owners.

Every day there was a slight haze of fine white dust in the air behind the three kilometers of fencing that encloses the plant yard. The haze saluted the fact that the railway dump cars and trucks were arriving on schedule with clay, gypsum and iron ore deliveries; the compressed air drills were getting the explosive shot holes ready at the nearby limestone quarry; the big Mercedes dump trucks were moving almost six hundred tons of blasted limestone into the plant daily; the conveyor system was running at capacity; the huge milling drums, loosening a steady thunder of tumbling steel balls, were pulverizing, drying and mixing the kiln feed at full production levels; and the bag-filling equipment was delivering a growing curve of shipments to trucks and railway freight cars.

The haze in the air could be seen – and just as easily apparent was an aura of optimism, the invisible imperative of economic development. ■

THE FIRST EMPEROR

Under Sargon I the kingdom of Akkad – world's first unified realm – stretched across the Middle East of 45 centuries ago

"SARGON THE FIRST! King of the city of Agade! King of the Land! King of Universal Dominion!"

After one thundering blast the horns were still. Now the musicians lifted their reed flutes in a thin piping, accented by the occasional roll of a drum. Cheers poured from the Babylonian army drawn up on the shore of the Sea of the Setting Sun, the body of water that men would later know as the Mediterranean Sea.

King Sargon looked at them over his shoulder, a thickset man dressed in fringe-like hanks of combed wool and holding a short spear. Then his dark beaky face lifted proudly as he stood before the multitude. In that one backward glance he had noticed the moon rising in the east. All the lands between the sun and the moon were now his, and he meant to add others to his empire before he died.

He had come a long way from his beginnings – born in secret to a lowly woman of Azupirani in Akkad. His mother had placed the unwanted infant in a reed basket and set it adrift on the sluggish waters of the Euphrates as they meandered south toward the lower kingdom of Sumer, known as the Land, and the Persian Sea. Akki, a toiler in the irrigation ditches, had discovered him and reared him to be a gardener, then a cupbearer. But it was his own shrewdness and audacity that made him a priest in Kish. There he had plotted rebellion against King Lugal-Zaggisi, organized troops and led them in the field. And Ishtar, goddess of battle, had been with him.

King Sargon prowled restlessly on the darkening beach. There was a south wind blowing – the Wind of the Ship that Sails Upstream – so he could not smell the sea salt, only the odor of crisp lamb browning at a campfire. There would be feasting as soon as he had plunged his spear into the western sea, the ritual act that proclaimed these coasts his own. Impatiently he looked at the sky again, for the soothsayers who guided him had declared that he must not perform the rite until the sun actually rested on the water.

Waiting thus, he remembered how gladly the men of Kish had followed him, many of them Semites like himself whose people had long ago come from the Arabian desert and taken on Sumerian customs. The wide rich plain between the Tigris and Euphrates Rivers, Akkad to the north and Sumer to the south, was ruled at that time by Lugal-Zaggisi, who greatly oppressed the folk of Kish. They had rejoiced to see a new power arise. Once he had captured the king and sent him in fetters to Nippur, he had gone on to conquer Erech and Lagash and Umma. Even a coalition of 50 governors could not stand in his way. He had rebuilt Kish and destroyed the walls of Ur, and marched down through the lagoons of the lower river to dip his spear in the Persian Gulf in token that his realm extended there.

Then the land of Elam beyond the Tigris had fallen to his phalanxes of archers, as ripe wheat falls when harvesters swarm through the fields. Three years, and he had turned westward to begin his conquest of Amorite country. This was his third journey here, this the eleventh year of his reign. But must he stop at the sea's edge this time? Should he not try his luck in fabulous Crete . . . and beyond?

The lower rim of the golden ball touched the surface of the twilight sea. Sargon strode to the waterside and thrust his spear under the white froth of the rippling waves. All that lay between the two seas was now his – the templed cities and the rich meadows threaded with canals and irrigation ditches, mile upon mile of wheat and barley fields, the granary of the ancient world. His were the silver mountains of the Taurus range to provide minerals not found in his own country, his the cedars of Lebanon for workers in fine wood. Such intense rejoicing filled him in his moment of triumph that he scarcely heard the cheers of his army. Other kings had ruled loosely knit groups of cities, but no other king since the beginning of time had created a mighty empire where the parts were closely joined and governed as one. His dynasty of Akkad was established.

Later he sat among his officials, the "sons of the palace," under the night sky. They ate barley, wheat cake, honey and spitted lamb, and drank date wine. Offerings of food and drink had been placed in alabaster vessels for Anu, Enlil and Enki, gods of the heavens, the earth and the sea, but plainer pottery served the mortal group, glazed bowls and cups of black and white and red. King Sargon, scorning cushions, half reclined on the turf, enjoying his food and the admiration of those around him. Torches lit the gloom where his retinue waited – the scribes, the barber who trimmed his long pointed beard and knotted his hair, the chief minister, the governors, priests and diviners. And behind them the shepherds, merchants and soldiers.

Now a boy stood up to pluck the lyre and sing a song of their own country many marches away. It was a fertile land he sang of, a network of canals and fields and gardens, where seed flung carelessly on the earth would bring forth three hundredfold. It had its cities, too, mazes of mud and reed huts, and towering brick temples and ziggurats, with friezes depicting the bull and the lion and vultures devouring the slain. It was a country of farmers and merchants and artisans, where women were held in honor and men studied the movements of the stars and recorded their knowledge and business transactions on tablets of sun-baked clay.

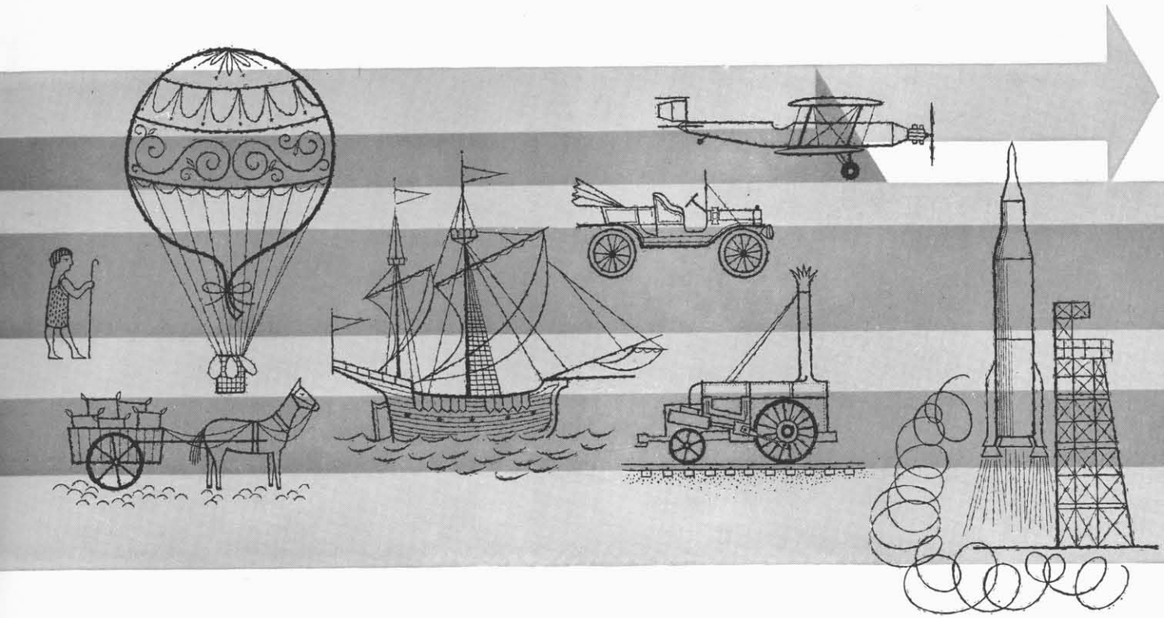
The date palm, the life-giving tree, thrust up everywhere to supply them with bread, wine, honey, fruit and vinegar. Other tall trees grew in the woodlands – cypress, tamarisk, sycamore, acacia and walnut. Lions, elephants and smaller game roamed beneath them, and herons, ducks and geese nested in the river marshes. Summer was long and blue and cloudless. Ice might form during the chilly rains of wintertime, but never snow. It was a beautiful country, this land between the rivers, worthy to be the world's first empire, and Sargon rejoiced that it was his to rule.

Suddenly he realized that his friend Agum-Shi was speaking to him.

"What of your next achievements, oh great Sargon?" he asked. "What do you mean to do?"

"Many things," said Sargon thoughtfully, stroking the bracelets of onyx, lapis and carnelian on his left arm. "The Hittites march against Ashur, and they must be despoiled and put down. I shall weld small estates into great ones and make division of my land into provinces five double marches each for the better governing thereof. Kazalla has rebelled, and I shall bring it to dust and heaps of ruin, destroying even the nesting places of the birds. I wish to enlarge the temple in my own city of Agade that I built, tracing its boundaries with dust from the walls of mighty Babylon, though the god Marduk may yet punish me for taking it away. And perhaps . . . ." He thought of Crete and looked into the west. "Perhaps I may yet venture forth on the world-encircling sea."

Sargon of Agade did do all the things he promised that night under the stars. He ruled for 55 years and bequeathed his empire to his sons, but their dynasty did not last long. There is some evidence that he visited Crete. He put down one rebellion in his old age, but was less successful with another and was finally driven into a trench and overwhelmed by his own men. So far back in time did he live that scholars have assigned various dates to his rule, among them 3800 B.C., 2800 B.C. and 2200 B.C. Later archaeologists with more evidence to judge by favor the latter date. His fertile country, Mesopotamia, is dry and sandy now since the collapse of his remarkable irrigation system. But the title of First Emperor still belongs to Sargon I. ■



MAN ON THE MOVE

THE BREATH of the wind sent the Spanish bark *Vittoria* homeward bound with a crew of 19 scurvy-wracked sailors. The year was 1522. Of the five ships that sailed from Seville, only the *Vittoria* had survived the around-the-world voyage. Although the expedition's commander, Ferdinand Magellan, perished enroute, history credited him with man's first circumnavigation of the earth.

Fickle winds and uncharted currents turned Magellan's odyssey into a nightmare that lasted three years for the handful of survivors. Accomplished at an average speed of one mile per hour, the voyage stands in dramatic contrast to a globe-girdling trip completed just last year. The *Vostok I,* hurled into space by rocket power, flashed through a global orbit in less than two hours at a speed of 17,000 miles per hour. Like Magellan's historic voyage, the lightning flight of Yuri Gagarin was another major milestone in man's never-ending quest for newer, faster ways to move from one place to another.

Man's search for motive power is as old as man himself. From the day he took his first faltering steps, he has been fired by the urge to get somewhere else. Unable to travel any distance by foot at more than four miles an hour, primitive man learned that by harnessing the larger, docile beasts, he could go a lot faster and a lot farther.

A galloping horse might whisk him along at close to 40 miles an hour for short distances. Camels made only half that speed, but their great stamina could carry riders for hundreds of miles non-stop across sun-struck deserts. And the nomad who acquired an elephant could lumber along for days at speeds up to 25 miles an hour.

Animal power presented few problems. For fuel, horses and other mounts could browse in wayside fields. They needed neither shelter, nor roads, until the time when man began fashioning carts and wagons. But animals were limited to land travel, and primitive man found his horizons checked by seemingly endless expanses of water that covered two thirds of his globe.

As a water traveler, man's debut was unimpressive. After poling clumsily about on floating logs for thousands of years, Stone Age man took a hint from the water bugs that skittered past him. By fashioning a crude paddle and lashing a few logs together, he found that he could propel himself along rivers and lakes. Oars recovered from Danish bogs have been dated to 7,000 B.C.

Oarsmanship reached its peak about 300 B.C. with the Phoenicians, Greeks and Romans. Their multi-tiered war galleys roamed the seas of the known world, with the muscles of 200 rowers furnishing the power.

Even earlier, the Egyptians had discovered that water travel was much easier if the wind's power was harnessed. By 1,500 B.C. Egypt's Queen Hatshepsut was sending trading expeditions up the Nile in galleys rigged with great square sails that wafted the vessels along whenever there was a following wind. Shipwrights of other nations fashioned sails of papyrus and flax, but like the Queen's river boats, these craft, with fixed sails, moved only when the wind blew from behind them.

The Arab *dhow* eventually mastered the caprices of the wind. About 500 B.C. Arab mariners on the Mediterranean began using triangular sails, called *lateen* sails, that could be adjusted to catch the breeze from either side or astern. The swift little dhows skimmed over the waves no matter which way the wind blew.

Once the idea of capturing the wind in large, adjustable sails caught on, all the waterways of the world became fair game. The great age of exploration in the fifteenth and sixteenth centuries, climaxed by the discovery of America and the opening of trade routes to the East, was made possible by improved sail power. Fittingly, the last of the commercial sail ships—the clippers—were the fastest and the most pleasing to the eye. With thousands of square feet of canvas billowing from masts a hundred feet tall, clippers, such as the *Cutty Sark* and the *Witch of the Waves,* carried men across the waters at more than 20 miles per hour.

The wind as a motive power became obsolete on the day in 1765 that Scottish inventor James Watt put the finishing touches on a curious device in which steam pushed a piston up and down. The idea dated back to at least 1650, when it was found that vapor given off by boiling water was alive with energy. Watt put his engine to work running a sawmill.

Farmers, however, preferred the power of a horse to Watt's strange-looking contraption. To sell his invention, Watt was forced to find an understandable formula that allowed him to compare his engine's work power to a horse's work power. He found that the average dray horse could accomplish about 22,000 foot-pounds of work per minute. To provide a margin of safety, Watt said that one horsepower equalled 33,000 foot-pounds. That figure and the term *horsepower* as a means of measuring work power are still in use today.

Inventors reasoned that if steam could run a mill, it could also propel vehicles and ships. A French nobleman, the Marquis d'Abbans, created a stir in 1783 with a steam-driven paddle-wheel vessel that could buck a stiff river current. Twenty years later, America's Robert Fulton launched his first successful steamboat, and by 1807 his famous *Clermont* was puffing up and down the Hudson between New York and Albany.

Steam power won worldwide attention in 1819, when the 100-foot American packet *Savannah* became the first steamship to cross the Atlantic. Even though the *Savannah's* engine broke down on the homeward voyage, forcing her to rely on her sail power, there was no doubt that steam would henceforth move men across water.

The steamship came into its own when Sir Charles Parsons, an English engineer, perfected an engine that replaced the less efficient pistons with revolving turbines. In 1897, officers of the British navy stood agape at a review in Spithead anchorage while Parsons' experimental ship *Turbina* whisked past them at almost 40 miles per hour.

On land steam was rapidly replacing animals. Since the beginning of time no man had ever moved faster than the horse he rode. Although the first iron horse, unveiled by the British in 1804, chugged along at only five miles per hour, it could haul more freight than 50 horses. A few years later, impressed by its blistering speed, engineers dubbed a new locomotive the "Rocket." Its top speed was 15 miles per hour. But by the middle of the century steam locomotives on both sides of the Atlantic were hitting 75 miles per hour.

At the same time a new source of power emerged to rival steam. In 1859, a former railroad conductor, Edwin L. Drake, drilled the world's first commercial oil well on a Pennsylvania hillside. That same year Etienne Lenoir of France conceived a practical internal combustion engine in which gas replaced steam. By jumping an electric spark across a cylinder and igniting the gas within it, Lenoir's device activated pistons. Germany's Gottlieb Daimler improved the engine by utilizing vaporized petroleum. Soon after, an internal combustion engine powered a tricycle at eight miles per hour, and it was only a short step to the

horseless carriage and the birth of the automobile age. The first automobiles were no faster than a man walking, but before the twentieth century was more than four years old Barney Oldfield, the pioneer auto racer, had sent his Winton *Bullet* roaring over the sands of Daytona Beach at the crowd-awing speed of 83.7 miles per hour. One witness noted that "man had at last attained a speed beyond which the human body might very well disintegrate."

Although petroleum products had assumed a role as the principal source of motive power, a role they still fulfill today, electricity, too, demanded a fair trial. Electricity was first looked on as an impractical form of motive power, but Thomas Edison changed the public's mind in 1880, when he drove his experimental train over a half-mile track at a noiseless 40 miles per hour. Eventually electricity revolutionized the rail industry with trains that traveled up to 200 miles per hour without having to carry their own fuel. Today's subways and elevated trains are almost always run by electricity.

Inspired by the success of electric trains, manufacturers began to flood the market with electric autos. But a top speed of 20 miles per hour and the necessity to stop every 25 miles for a battery recharge made the electric auto an inconvenient means of locomotion. The fad died quietly in the 1920's.

While Edison and his followers were electrifying the rails, a German engineer, Rudolf Diesel, constructed an internal combustion engine that burned oil, a fuel that was cheaper and cleaner burning than gas. The Diesel engine proved itself in the submarines of World War I, and then went on to become the predominant source of power for large ships, railway locomotives and trucks.

Perhaps man's most dramatic attempts to move have been through the air. That it is one of man's oldest dreams is indicated by the famous legend of Icarus, whose wings of feathers and wax melted when he flew too close to the sun. But gas-filled balloons, not wings, first moved man through the air. By 1780, balloon flights were commonplace all over Europe. Balloons were almost impossible to maneuver, and when they persisted in drifting out of sight or coming down in flames, inventors went back to the idea of imitating birds.

Otto Lilienthal of Germany perfected a glider in 1848. Its bird-shaped wings carried him aloft on thousands of short flights, until he lost his life one day when the wind suddenly slackened. But the challenge was laid down. In much less time than it had taken him to conquer the land and the sea, man became master of the skies. Orville and Wilbur Wright affixed a 12-horsepower internal combustion engine to a winged frame in 1903 and flew a momentous 120 feet. The feat proved that an excess of air driven under a wing by a fan-like propeller would raise a heavier-than-air machine from the ground. In a scant 40 years pilots were flashing through the air at speeds close to 500 miles an hour.

But the age of propeller-driven aircraft ended dramatically late in World War II, when the German *Luftwaffe* launched a radically new plane. Inventors had found that a jet of gas could give a plane far greater thrust than a propeller. Adapting the squirt principle that propels the squid and cuttlefish through water, they conceived the ram jet, basically a hollow tube into which air is gulped, heated by combustion of fuel, then expanded and ejected with a force that hurtles the plane forward. The jet quickly doubled existing air speed records. Today airmen talk about pounds of thrust rather than horsepower when describing the jet's might.

With all its speed and thrust, the jet proved powerless to move man toward yet another goal—outer space. Beyond the earth's atmosphere there is no oxygen necessary to support the combustion of a jet's fuel. And to get to outer space, a craft must escape the earth's gravity by moving at 25,000 miles per hour, speed far beyond the fastest jet.

Science found the answers to space-travel problems in the rocket, a device invented almost a thousand years ago by the Chinese to repel Mongol invaders. Used for centuries mostly as a toy, the rocket came of age when scientists in Germany, Russia and the United States stepped up the rocket's thrust with fuels that carry their own oxygen. The pace of rocketry technology has been swift beyond belief. Hardly a week passes without man stretching ever closer to planets that only a few years ago seemed far beyond his grasp.

Even the atom, the universe's basic building block, has been pressed into service to move mankind from one place to another. The potential of nuclear energy as a propellent was demonstrated first in American submarines such as the *Nautilus,* then in the Russian icebreaker *Lenin* and more recently in the first nuclear-powered commercial vessel, the *Savannah,* aptly named after the little wooden ship that helped usher in the age of steam 140 years ago.

Of course, not all attempts to find suitable propellents have been successful. Chinese Emperor Wan-Hoo invented a space throne in 1500 A.D. in a premature attempt to reach the moon. He tied rockets to his throne, grasped a kite in each hand and ordered the fuses ignited. The throne blew up. Hardly more successful was the 300-foot subway built in New York in 1869. Powered by compressed air, the train with its frightened passengers was blown from the depot at one end of the tube to the depot at the other end.

Though failures, such efforts stemmed from the constant exercise of man's imagination to perfect ever better and swifter means of moving. It's the same persistent ambition that has caused man to move at 400 miles per hour by auto, 200 by rail, 4,000 by jet craft and almost 300 on water. Even the unaided human muscle has been goaded into carrying man farther and faster. The once unattainable four-minute mile has been forgotten as athletes approach 3 minutes and 50 seconds.

But that record and even the 17,000-mile-per-hour speed of spacecraft are but way-stations for man-on-the-move as he relentlessly conquers time and distance. ■

Charles M. Doughty

Arabian Odyssey

A 21-month visit with the people of the desert gave Charles Doughty one of the closest Western looks at Arab life

SHAIKH ZEYD SITS CROSS-LEGGED in his tent and welcomes the circle of Bedouins who have come for morning coffee before the caravan moves out. He offers a special greeting to the man directly across from him—an unusual figure garbed in Arab robes, but with blue eyes, blond hair and European features.

"If I can help you in any way, my friend," the shaikh says, "you will do me an honor to say so."

The European replies in fluent Arabic with the bare trace of an English accent: "You are most kind, O Shaikh,

Arabian Odyssey

but it is enough that I may travel with your caravan and mingle with your people. My notes are almost complete. I shall write my book when I return to London. Perhaps you will favor me once more by accepting a copy?"

Shaikh Zeyd nods his assent and thanks. Then both become absorbed in the conversation of the coffee circle.

Charles Montagu Doughty had come a long way to reach the tent of Shaikh Zeyd in what is now Saudi Arabia. He was born in Sussex, England in 1843. As the youngest son of a clergyman's family, his natural vocation was the church, but he had a taste for adventure and tried for a career in the Royal Navy instead. The naval doctors rejected him because of a slight speech defect that never interfered with his subsequent linguistic accomplishments.

Still thirsting for adventure and well grounded in the classics by his father, he decided to combine scholarship and travel. After mastering everything from geology to Greek and Arabic at London and Cambridge Universities, Doughty wandered across Europe, deciphering ancient Scandinavian inscriptions and tramping over Roman remains in Spain.

But his destiny was calling him across the Mediterranean, across Syria, to the vast, fascinating Arabian desert, and to the people who spoke the mellifluous language he found so enchanting.

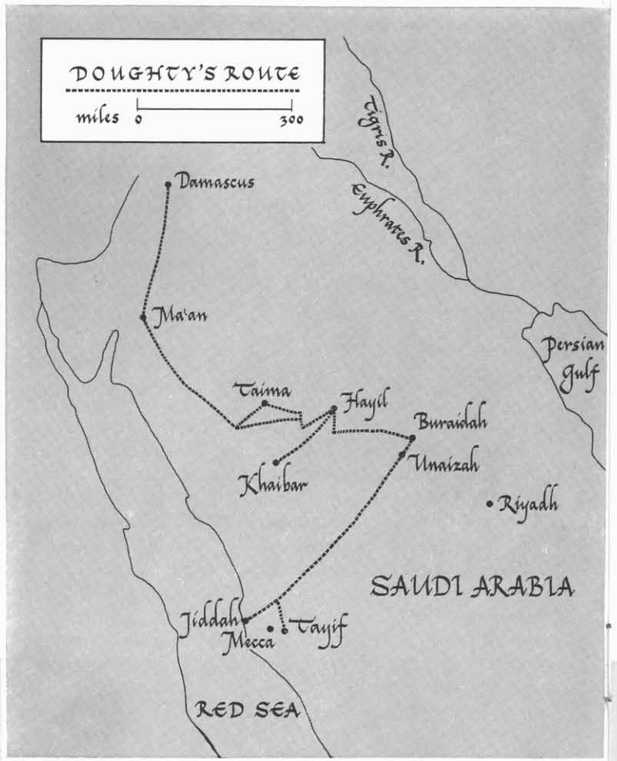
He went to Damascus in 1876, joined a caravan headed into the desert, found the life of the nomad everything he had hoped it would be, and spent two years visiting one of the world's most interesting lands. The Bedouins welcomed him. He repaid the compliment by devoting to them a masterpiece of travel literature: *Travels in Arabia Deserta*.

The superiority of this book to the countless others written by visitors to Arabia is partly a matter of style. Doughty deliberately chose to write in the Arab idiom, as far as he could translate it into English. His sentences are not polished and sinuous in the tradition of Swift and Addison. They recall an earlier period when constructions were bolder and the flow of rhetoric was habitually interrupted by staccato interjections because it was meant to be spoken rather than read. His style is seen in a passage describing a caravan setting out from Damascus.

"The *hajjaj* were this year by their account . . . 6,000 persons; of these more than half are serving men on foot; and 10,000 of all kinds of cattle, the most camels, then mules, hackneys, donkeys and a few dromedaries of Arabians returning in security of the great convoy to their own districts. We march in an empty waste, a plain of gravel, where nothing appeared and never a road before us. Hermon, now to the backward, with his mighty shoulders of snows closes the northern horizon: to the nomads of the East, a noble landmark of Syria, they name it Towil eth-Thalj, 'The Height of Snow'."

Doughty was in Arabia to learn about the desert and its peoples. He kept his eyes and ears open wherever he went, and every aspect of nomadic life was carefully recorded in his notebook.

The caravan, a long file of men and animals, is like a town on the march, Doughty remarks. The camels, those indispensable members, plod along in bovine contentment, unmindful of heat or sand or occasional showers. The mules are less patient: they have to be goaded when they don't like the sun or the footing. The baggage sways from side to side as the sand gives way, perilously tilted but rarely falling off. The owners ride or walk, generally in good-humored acceptance of the hardships of their way of life. Doughty rides or walks beside them, marveling at their composure even when blistering sandstorms whip up.



He finds the camel drivers a beguiling tableau as they squat on the sand drawing patterns with their sticks until it is time to mount, after which they become the pilots of the caravan. They are also the first to know when it is time to halt, for they are sensitive to the diminishing strength of their desert steeds.

The heat of the day is no time to be out on the burning sands. With expert speed tents are unfolded and set up, animals taken care of, and everyone retires indoors. Many of the caravaneers promptly begin their siesta. Still, there is always someone stirring—camel drivers repairing harnesses, women cooking meals, children playing. They will all reappear in the writings of the English stranger who strolls among them and who can be seen busily jotting down notes when the flap of his tent is open.

With the cool of the evening, the encampment comes to life. Now is the time for sociability. Visits are paid between tents. There is shouting and singing and lively conversation. Doughty is struck by the exchange of pleasantries, news and gossip: "A pleasure it is to listen to the cheerful musing Bedouin talk, a lesson in the traveller's school of mere humanity."

The intimacy with which Doughty entered into the life of the desert is amazing considering the transience of his stay. Unlike other famous Westerners, such as St. John Philby and T. E. Lawrence ("Lawrence of Arabia"), whose extensive knowledge of the Arabs came from years spent among them, Doughty was simply a visitor. He remained in Arabia for only 21 months and returned to England when his visit was over. He never again saw the land which had lured him halfway around the world. That is why his achievement seems so miraculous.

He held a mirror to Bedouin life, as in the masterful literary portraits that give drama and sparkle to his pages. Here is his description of the Nimrod of Kheybar.

"Amm Mohammed—endowed with extraordinary eyesight—was more than any in this country, a hunter. Sometimes, when he felt himself enfeebled by this winter's (famine) diet of bare millet, he would sally, soon after the cold midnight, in his bare shirt, carrying but his matchlock and his sandals with him: and he was far off, upon some high place in the Harra, by the day dawning, from whence he might see over the wide vulcanic country."

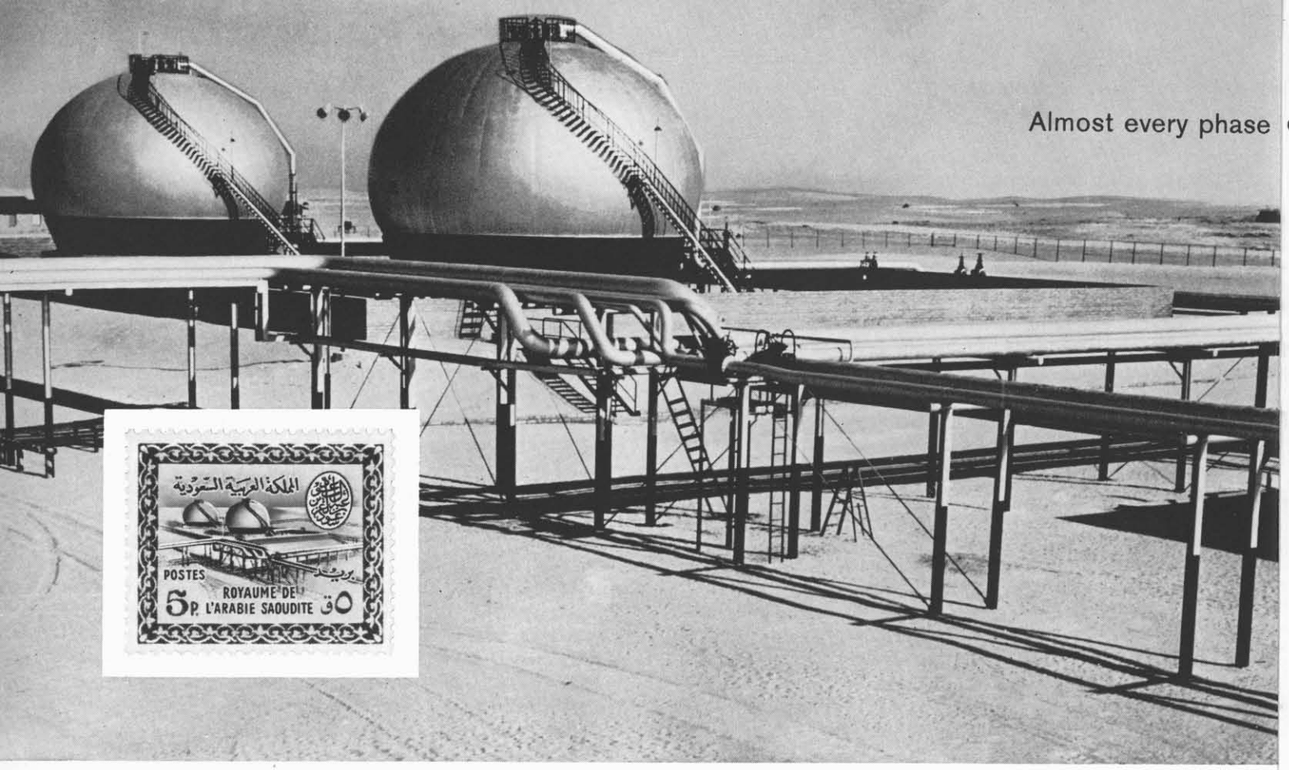
Doughty took notes day by day instead of leaving the book he had in mind to his memory and creative imagination. Although he was far more interested in the people than in anything else, he managed to record scientifically the geology of the peninsula, the topography from the Syrian border to Mecca, the character of the towns along the way. He noticed everything from the historic inscriptions of Mada'in Salih to the pumpkin gardens of Jiddah.

Although most of his observations are recorded in words, many are recorded in pictures as well, for he was a skilled draftsman. His drawings include topographical reproductions such as those of the plain of Tebuk and the mountains of Anaz. He lets the reader see what the ancient coins of Arabia looked like, and how the Syrian rock inscriptions appear today. There are diagrams of town architecture and Bedouin tents. But the greatest achievement of Doughty as illustrator of his own book is the splendid map he drew of the areas where his Arabian odyssey took him. He called it "A Sketch Map Itinerarium of Part of North Western Arabia and the Negd." A cartographer's delight because of its accuracy, the map is also a reader's delight because of its brilliant coloring and stylized layout.

Doughty was so meticulous with his facts and figures, so authentic in his drawings and diagrams, that to this day travelers carry his *Arabia Deserta* as a guidebook.

With a scholar's devotion to a subject he loves, Doughty labored over his manuscript for nine years before it went to the printer. During this decade he lived in England almost as a recluse, gratified when St. John Philby brought a party of Arab friends to see him during World War I. *Travels in Arabia Deserta* occupied Doughty through three editions.

What was Charles Montagu Doughty's most memorable achievement? Doubtless he himself would have pointed to the legend he left behind in Arabia. The Arabs still were talking about their remarkable visitor when T. E. Lawrence arrived years later. Lawrence wrote: "I spent nine months in Western Arabia, much of it in the districts through which he had passed, and I found that he had become history in the desert." ■



Inspiration for the design of oil stamps often comes from actual oil operations, such as Aramco's gas-oil separator installation at Buqqa, Saudi Arabia. This GOSP, shown on our cover, reduces pressure and removes gas that accompanies the oil to the surface.

OIL STAMPS

And God said unto Noah . . . Make thee an ark of gopher wood; rooms shalt thou make in the ark, and shalt pitch it within and without with pitch.

THUS GENESIS RECORDS the first use of "rock oil," a substance which seeped from Old World springs as long ago as 4000 B.C.

Bitumen – the general term applied to inflammable substances found in the earth – formed the cement used in the walls of King Solomon's Temple. It served as mortar in the construction of the Tower of Babel. With it the Egyptians embalmed their dead, calling it "mumia."

Asphaltum and its more volatile naphthenic liquids were the Biblical "rock oil" that the Greeks knew as *petros olaion* and the Latins as *petra oleum*. Traces of asphalt, a modern paving material, have been found on old Roman roads.

From these ancient uses the jinni that sparked Aladdin's lamp – petroleum – has come a long way, and nowhere is this refinement over the centuries more colorfully reflected than in a stamp album. Without stirring from their armchairs, philatelists learn much about the history, romance and high adventure of the oil industry, for stamps often commemorate oil's uses and international value as a world energy resource. Theirs is "wildcatting" in a relaxing way.

To begin with, the armchair observer discovers that Iraq, old Mesopotamia, issued a stamp in 1923 showing the *guffas* on the Tigris River. It may well be that these round boats, made by stretching skins over a palmwood frame and then coating them with pitch or asphalt, are the earliest oil tankers. Other Iraqi oil stamps show King Faisal II against a backdrop of oil wells and, in 1957, an oil pipeline compressor station.

Saudi Arabia, where the Arabian American Oil Company holds important concessions for exploration and development of oil and gas reserves, issued its first oil stamp in 1961. There are 13 stamps of identical bi-colored design in different denominations and colors.

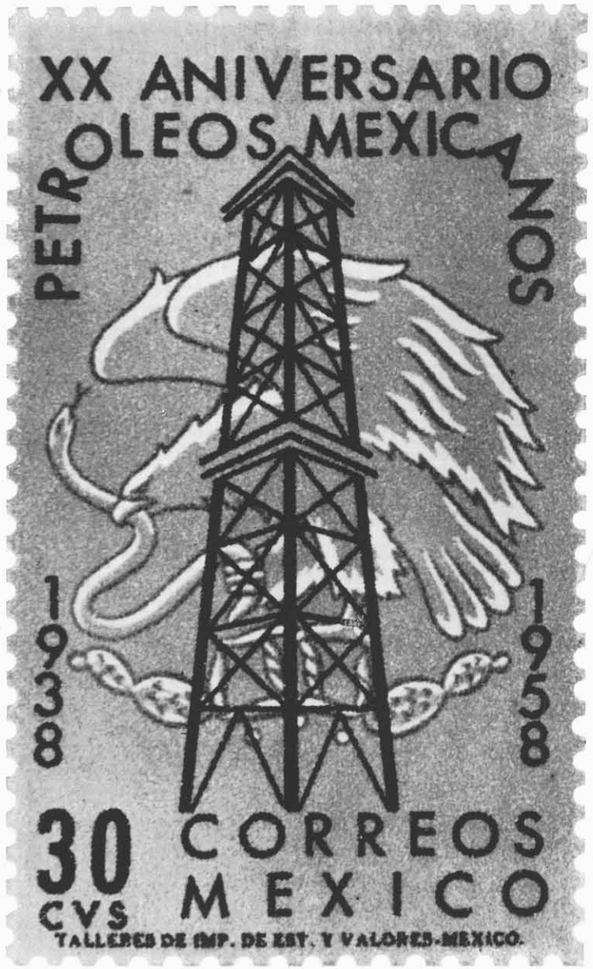
Jordan issued two denominations in 1961, each showing the oil refinery at Zarka on the occasion when this modern installation went on stream.

Iran, ancient Persia, issued two sets of colorful oil stamps

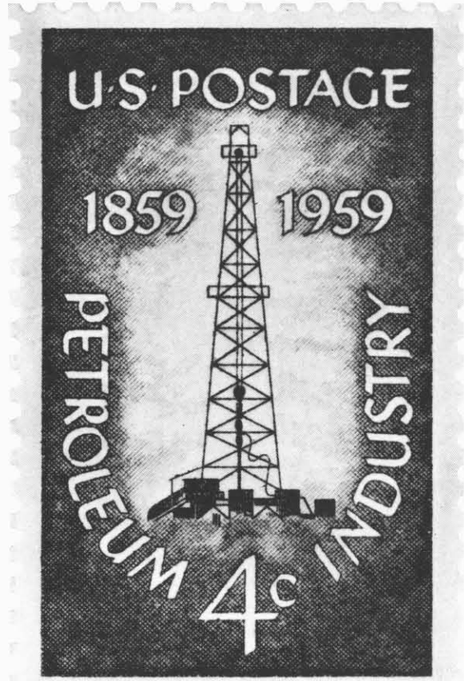
Almost every phase of the oil industry has been commemorated on the hundreds of stamps devoted to petroleum

Oil motif adorns stamp issued last year by Republic of China.

Cupped hands filled with crude oil highlight stamp to honor industry's 50 years in Argentina.



Mexico has been a crude oil producer since 1901 but did not issue an oil stamp until 1958.



The United States issued its first oil stamp in 1959 to honor the 100th anniversary of the industry in America.

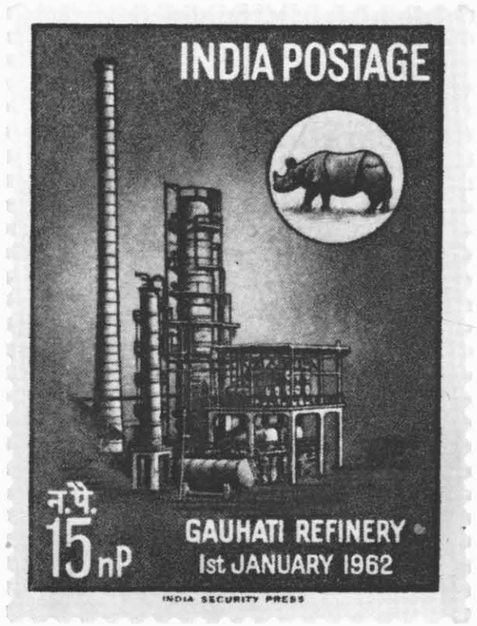
Postage from new nation of Nigeria celebrates industries, such as oil, and birthday of independence.

OIL STAMPS

Middle Eastern oil-producing nations of Iran, Iraq, Kuwait and Jordan all have issued a series of stamps depicting various phases of the oil industry.

Dutch island Curacao, off South American coast, issued 1955 stamp picturing oil processing unit at Aruba.

Marble columns, oil rigs adorn Italian stamp, issued for 4th International Petroleum Congress, Rome, 1955.



A refinery at Gauhati, India was the first of three new refineries opened during the past year in India.

in 1953 to commemorate the discovery of oil at Qum. One design shows an oil well with mosques in the background. The other, of horizontal format, features an oil well, mosques and a bas relief from the ancient city of Persepolis.

Four years ago Iran issued a set of two stamps to commemorate the fiftieth anniversary of the drilling of the first oil well. In them a hand holds a dish of flaming oil – symbolic of the perpetual fires of Iranian myths.

One of these early myths refers to an eternal fire that needs no feeding and can be found on the shore of the Caspian Sea. The religion of the fire worshippers of which Zoroaster was the leader was based on this Old-World wonder. It has been perpetuated by the "temple of eternal fire" on the stamps of Azerbaijan, now a Soviet state, which prior to 1925 had issued 32 oil stamps.

Enjoying a major oil boom, Libya has issued three identical bi-colored designs showing a map of the Zelten Field and an oil tanker at Marsa Brega, plus a unique triangular pictorial honoring the International Fair at Tripoli early this year.

Most European nations have recognized the oil industry on their postage. France, with a beautiful design showing a modern drilling rig in the Bordeaux area and another of a Sahara exploration project, is outstanding.

The Netherlands pictures a large oil refinery in Curacao on one of its issues commemorating the tercentenary of this Dutch West Indian island on which Venezuelan oil is refined.

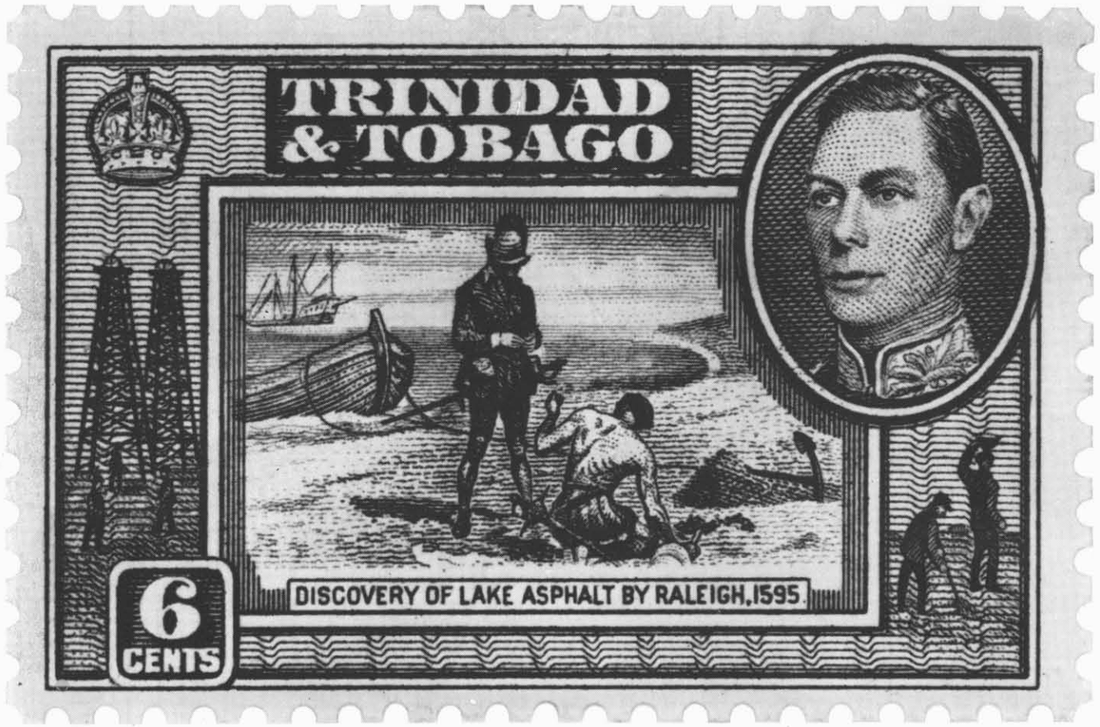
Italy, Poland, Greece, Austria, Bulgaria, Czechoslovakia and Russia have all issued oil stamps. Romania with 90 varieties has put out more oil topicals than any other country.

In South America, where many of the nations have recognized petroleum on their stamps, Venezuela has issued some 80 oil stamps in various postage, air mail, revenue and departmental varieties. One of the more popular older sets shows oil derricks on Lake Maracaibo, world-famed oil production area.

Colombia, Argentina, Chile, Guatemala (rather oddly because it has no production or refining), Peru, Brazil, Bolivia and Mexico are other Latin American nations which have recognized the oil industry on their postage stamps.

Today some 54 countries produce oil and/or natural gas, and 44 of them – plus Lebanon and Guatemala which are non-producers – have issued a total of 451 postage, air mail and revenue stamps whose designs pertain to the oil business.

"The world is a great book," wrote St. Augustine, "and they that never stir from home read only a page." Not so with the stamp collector, for Marco Polo himself would have been enchanted with the revelations of these little pieces of paper which carry the mail. ■



Stamp from British Commonwealth islands of Trinidad and Tobago honors the late King George VI, oil fields and Sir Walter Raleigh's discovery of Lake Asphalt.

So majestic are the cedars of Lebanon that they are called . . .

"CEDARS OF THE LORD"

TWENTY-FIVE CENTURIES AGO the prophet Ezekiel searched for a symbol, one word to capture for all time a vivid recollection of the Empire of Assyria, then being overshadowed by the Chaldeans under Nebuchadnezzar. He sought one symbol to stand for many things – might, power, beauty, majesty.

Ezekiel found his word, then wrote:

"Behold, the Assyrian was a cedar in Lebanon with fair branches, and with a shadowing shroud, and of an high stature; and his top was among the thick boughs. . . . All the fowls of heaven made their nests in his boughs, and under his branches did all the beasts of the field bring forth their young, and under his shadow dwelt all great nations. . . . The cedars in the garden of God could not hide him: the fir trees were not like his boughs, and the chestnut trees were not like his branches; nor any tree in the garden of God was like unto him in his beauty."

The trees of which Ezekiel spoke–*cedrus libani* in Latin, *arz al-Rabb* or "Cedars of the Lord" in Arabic – still grow in Lebanon. Often they attain a height of more than 80 feet and a trunk circumference of over 40 feet. Their branches, which bear dark green leaves, spread horizontally, sprouting from the trunk in ascending tiers.

Highly polished and reddish in color, the wood emits a spicy odor and is impervious to attacks of insects and worms. A legend speculates that the Cross of Jesus, which remained undamaged after three centuries in the ground, must have been made of cedar. The tree itself can live for thousands of years.

Cousins of *cedrus libani* are found in Asia and Africa. So heroic in size and stature are these members of the family that botanists have given them equally imposing names. The *cedrus deodara* grows in the Himalayas and is called "wood of the gods," the *cedrus atlantica* is found in North Africa and is named after mythological Atlas.

Cedars of Lebanon are native to modern Lebanon and Syria, and their location at the crossroads of the ancient world assigned them a significant role in the drama played there by many races long ago. A high commercial value was placed on the cedar, and many uses were found for it.

Assyrian King Ashurnasirpal ordered cedar for the beams of his palace. The roofs of the Temple of Diana at Ephesus and the Temple of Solomon at Jerusalem were made of it. Cleopatra's luxurious Nile barges were constructed of cedar, as were the mysterious solar ships which the ancient Egyptians placed in their pyramid tombs for the use of the dead.

Both Roman natural scientist Pliny the Elder and Greek physician Dioscorides Pedanius recommended the bark and resin of the cedar for a variety of ailments. Egyptian embalmers employed the sawdust and an extract of the resin (cedria) in ritual mummification ceremonies. They called the resin extract the "life of the dead." The living used an essence of the fragrant gum in perfume.

From the era of the Crusades to relatively recent times, the timber of the cedar tree has been prized as an essential material in the construction of churches. Helen, mother of Roman Emperor Constantine, used it in the Church of the Holy Sepulchre, which she had built in Jerusalem in the fourth century. Five centuries later cedarwood was shipped to Paris to become part of the Sacre Coeur.

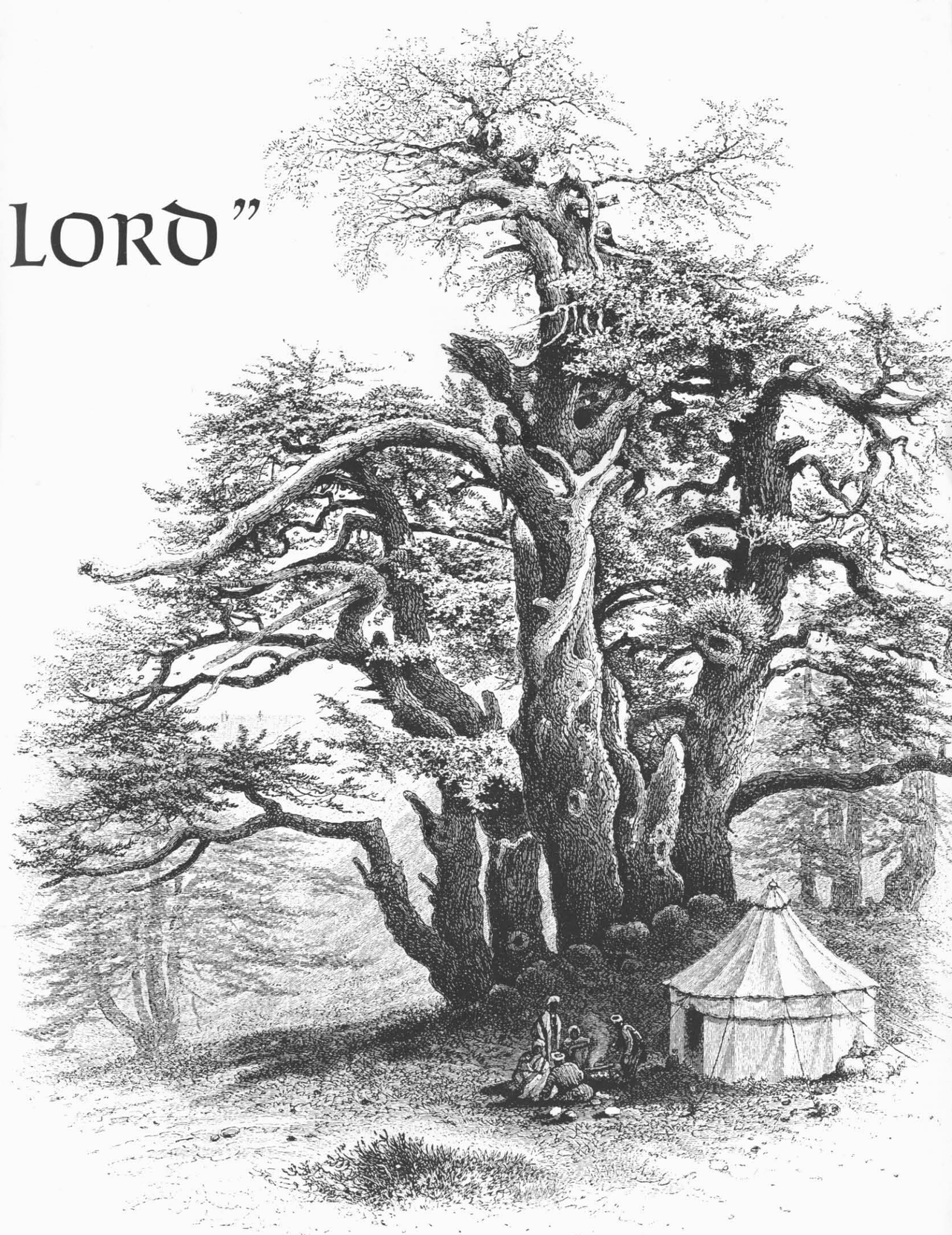
Hundreds of centuries of trade in the valued trees took their expected toll. The oldest trees, the giants, were always felled first, and gradually the forests that covered the mountains became isolated woods. The woods became groves; some disappeared entirely. Three centuries ago a traveler in Lebanon counted only 28 trees that were very old. Today there are a mere dozen. The total number of mature cedars is barely 400, and few are more than a thousand years old.

Most of the 400 are located in two scattered groves: one above the snowline on Jabal Makmal in the north, the other on the western slope of the Barouk in central Lebanon. The groves are surrounded by low stone walls to keep out foraging animals and to discourage the contact of mankind, which admired and destroyed so many cedars long ago.

The reverence and protection accorded the trees today is fitting. These two groves echo a splendid past. In this corner of the world man created his early history. Some of his finest civilizations rose and fell here, many of his finest monuments stand here in ruin.

One tree alone, the most perfect of them all, serves him today – the Cedar of the Flag. Its replica is carried on the flag, stamps and official documents of the Republic of Lebanon. One tree – a symbol of the past and a sign of the future, for on the sloping hills near Hadath, under the care and protection of the Maronite Patriarch of Lebanon, 6,000 young Cedars of the Lord are growing. They will still be growing a dozen centuries from now.

They are the seedlings of the ancients, an assurance to the peoples of the Middle East that what was . . . will be. ■



Time of the Hundred Men

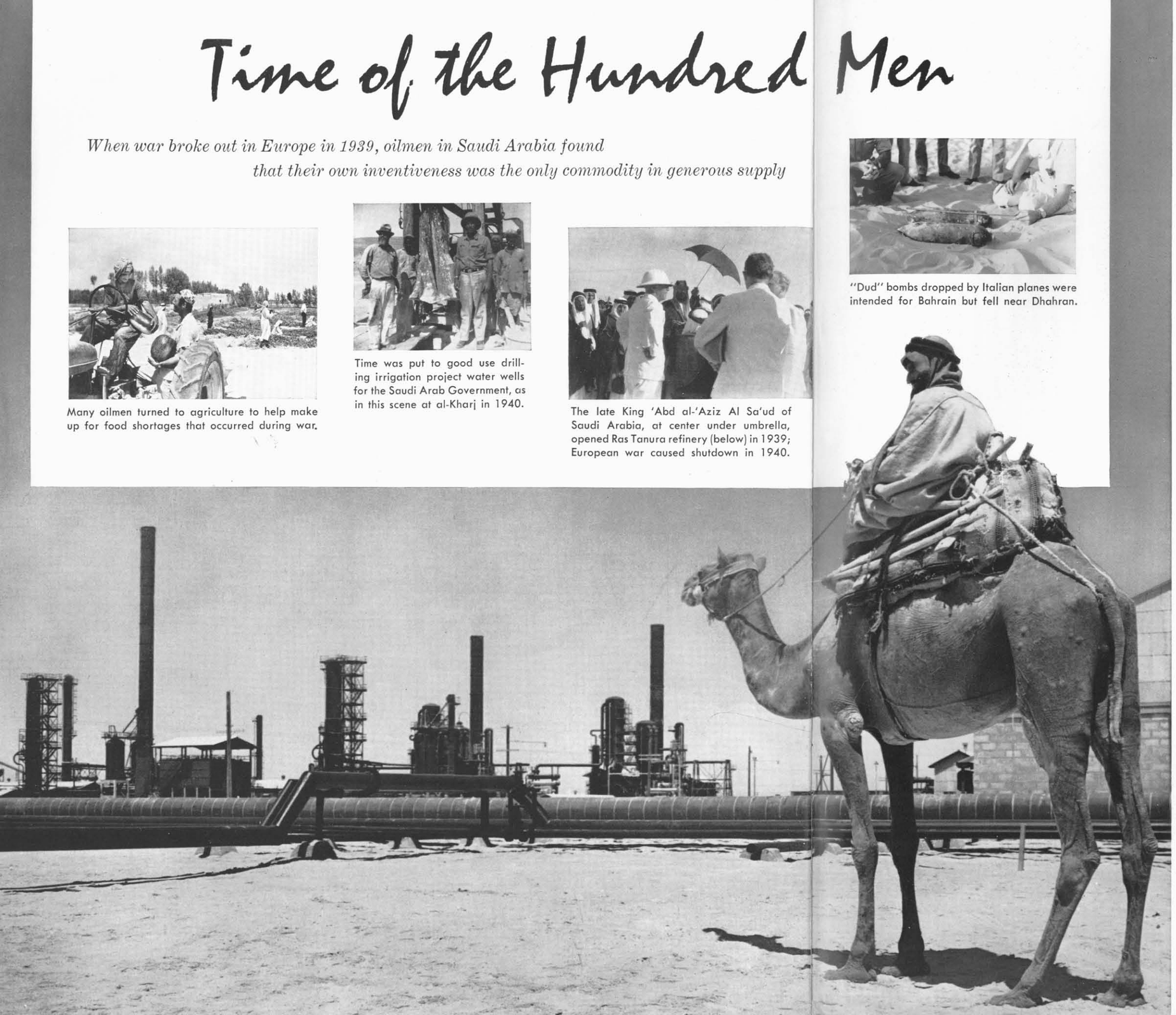
When war broke out in Europe in 1939, oilmen in Saudi Arabia found that their own inventiveness was the only commodity in generous supply

Many oilmen turned to agriculture to help make up for food shortages that occurred during war.

Time was put to good use drilling irrigation project water wells for the Saudi Arab Government, as in this scene at al-Kharj in 1940.

The late King 'Abd al-'Aziz Al Sa'ud of Saudi Arabia, at center under umbrella, opened Ras Tanura refinery (below) in 1939; European war caused shutdown in 1940.

"Dud" bombs dropped by Italian planes were intended for Bahrain but fell near Dhahran.



It was DECEMBER 1941. The war-depleted American oil camp at Dhahran, Saudi Arabia was down to a quarter of its former size. Christmas was only a few weeks off, but the hundred lonely American men remaining in Dhahran couldn't muster up much holiday enthusiasm. Their wives and children had been shipped home to the United States. Family life had ended for the duration of the war, and the camp had quietly slipped back into pioneer ways.

On December 7 the hundred men heard the stunning radio announcement of Pearl Harbor. Within three days the radio told them that the United States was at war with Japan, Germany and Italy. Now they were truly isolated.

Without saying so they knew that the forthcoming wedding of nurse Anna Mary Snyder, one of the two women remaining in Dhahran, and Bob Williams would be the biggest – and probably the last – community get-together for a long time.

On the day of the wedding the men slipped into the auditorium-chapel well ahead of time. Each wore a tie, a white shirt and a suit. When a scratchy phonograph record gave up the strains of "Here comes the bride," men who had fallen back into the outpost habit of wearing rumpled suntans every day of the week sat up stiffly in their dark suits.

The happy spirit carried over into Christmas. The wedding taught the isolated men that not even war can stop the onrush of life. But there were some things the war did stop. For example, the small "tea kettle" refinery completed at Ras Tanura in the autumn of 1940 was shut down. And the 20-mile string of channel lights that guided tankships through the Persian Gulf to safe mooring was darkened.

But perhaps the most disappointing wartime setback to the Arabian oil pioneers came when it was decided to shut-in Abqaiq No. 1. This well had been started in August 1940 and within a few months flowed an exceptional 10,000 barrels a day. A laconic cable to the United States had said that the well showed "the possibility of a big new field."

Then, one night in October 1940, Italian planes bombed the refinery on Bahrain Island (a British protectorate) and the crude oil separator plant in Saudi Arabia. Surely one of the strangest air raids of World War II, it missed both targets despite bright moonlight, the jewel-bright lights of the refinery and the high-noon brilliance of the bombers' magnesium flares. "Bahrain has been destroyed," the Axis radio proclaimed.

As a military tactic the raid was pure comic opera. But as a psychological thrust, it was effective. The Bahrain refinery was shut down immediately for blackout preparations. A few days later Abqaiq No. 1 was shut-in. It was, as postwar developments proved, the discovery well of one of the world's greatest oil fields.

Almost within hours of the bombing American women and children were being evacuated from Saudi Arabia.

It was a strange period for the men who chose to stay in Dhahran. Their diarist, balladeer and historian, Phil McConnell, has called it "the time of the hundred men." But as a diarist with a quick eye for the humors of human incident, McConnell could just as readily have called it the