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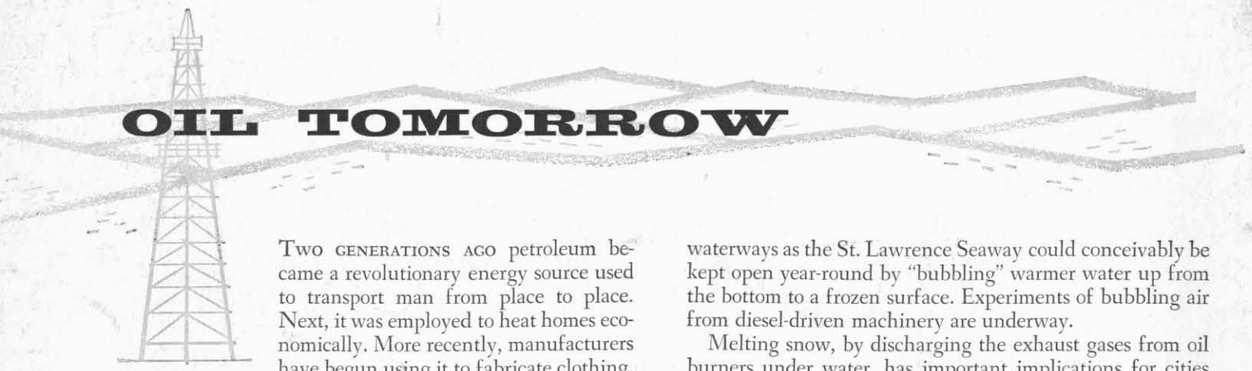


OIL TOMORROW

Two generations ago petroleum became a revolutionary energy source used to transport man from place to place. Next, it was employed to heat homes economically. More recently, manufacturers have begun using it to fabricate clothing, wash dishes, and fill medicine cabinets. Tomorrow, this versatile natural substance may be called in to complete the cycle of human needs – it may help feed man.

The 104 years since the first successful well-drilling in Pennsylvania have been lively. But oil's second century promises to be even more exciting. The industry's new pioneers are already seeing to that. Last year, in the United States alone, oil industry chemists, physicists and engineers conducted $328 million dollars' worth of research. The year before, the figure was almost as large. The fruits of their study, however, could prove to be every bit as astonishing as the costs. Here are a few of the uses of oil tomorrow which are being tried out today.

FOOD FROM OIL . . . The creation of synthetic protein from petroleum to help feed food-shortage areas is high on the list of current British and American oil company research projects. Manufacture of fats, sugars and other carbohydrates from oil *is* possible. The Germans tried out butter made from oil as far back as World War II.

MORE USES FOR ASPHALT . . . Asphalt obtained from petroleum residue is turning up increasingly in homebuilding, in the form of shingles, siding, flooring and insulation. Soon, scientists say, it will even appear in upholstery in quantity. But asphalt's most dramatic new facet may show up in botany. A cotton, corn or other field covered with an asphalt film effectively retains moisture normally lost through evaporation. And after the six weeks required for seed germination and soil breakthrough, the film conveniently disappears. When perfected, asphalt film may very well revolutionize agriculture, even alleviate now-perpetual "dust bowl" conditions in large areas of the world!

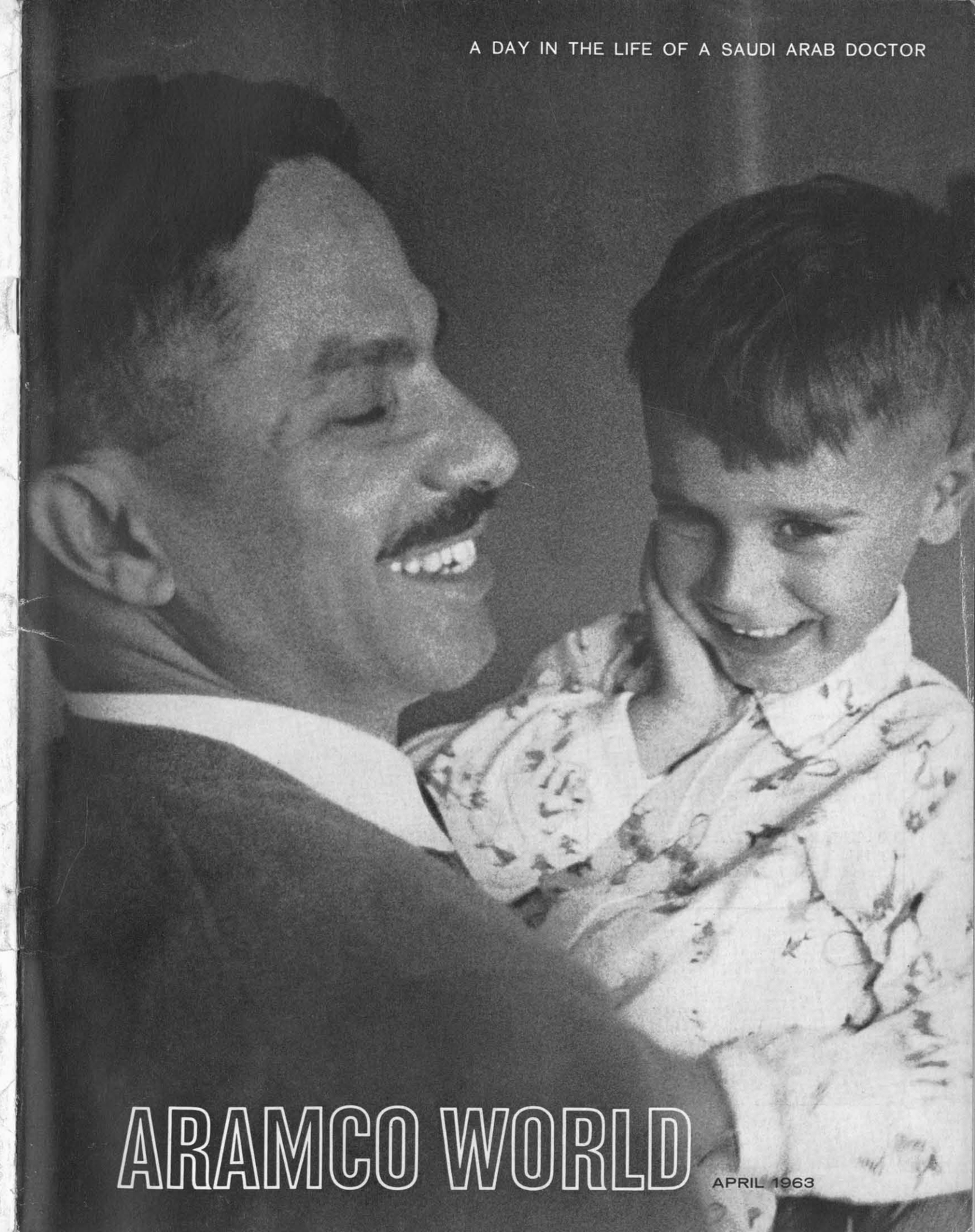
UNWANTED ICE ELIMINATED . . . Such important world waterways as the St. Lawrence Seaway could conceivably be kept open year-round by "bubbling" warmer water up from the bottom to a frozen surface. Experiments of bubbling air from diesel-driven machinery are underway.

Melting snow, by discharging the exhaust gases from oil burners under water, has important implications for cities where removal problems are acute. This futuristic method is already in operation at a Massachusetts parking lot, where snow is bulldozed into a pit for melting instead of being hauled away.

PETROCHEMICALS FOR EVERYTHING . . . Already responsible for many plastics, fibers and synthetic rubber, petrochemicals will play an immeasurable role in tomorrow's demand for new products. As the name implies, petrochemicals are chemicals made from petroleum, specifically from the hydrocarbons found in the latter. How do scientists change these hydrocarbons into drip-dry shirts and plastic dishes? By cracking and separating parts, somewhat in the manner a cook separates the yolk from the white of an egg. One of the petrochemist's recipes might call for making material for raincoats. With a slight variation, he may produce the chemicals used in detergents, or say, the fizz in a bottle of soda. *His* "kitchen," however, is a sprawling, multiple-tower cracking plant.

Petroleum is wonderfully compliant about being broken down and allowing its atoms and molecules to be arranged in new combinations. Thus, with current knowledge, it is thought that chemists can make 500,000 such combinations (chemical compounds) from petroleum. In practice, petrochemicals today account for 25 per cent of all chemicals made; in ten years the percentage is expected to double.

There indeed seems to be no end to the tasks that petroleum will be asked to perform. That fact would startle those ancient peoples of the Middle East who, 6,000 years ago, recorded their objections to the "rock oil" that seeped into their water springs. It took them awhile to find uses for the black, sticky substance. Those who came after them have never stopped finding uses. ■



A DAY IN THE LIFE OF A SAUDI ARAB DOCTOR

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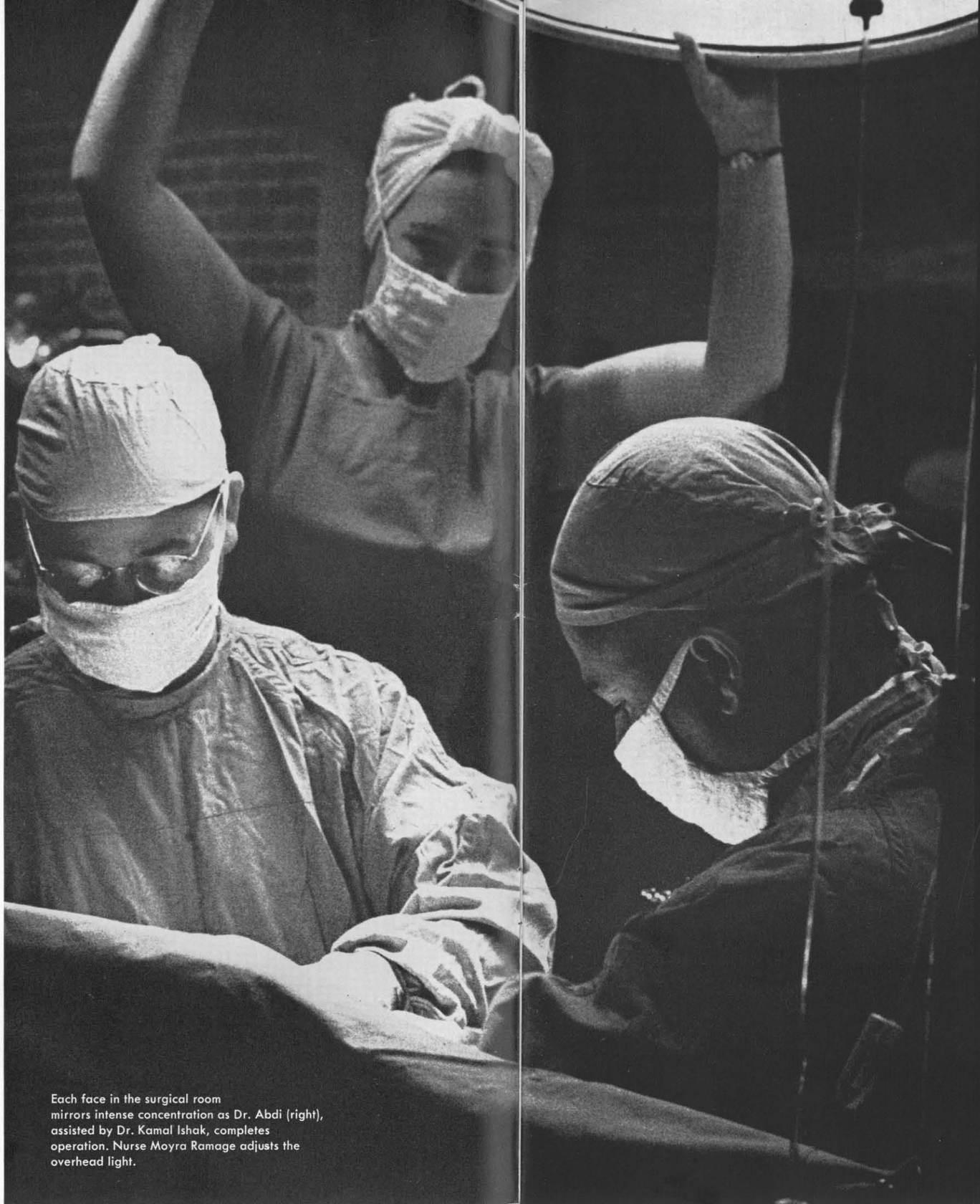


Each face in the surgical room mirrors intense concentration as Dr. Abdi (right), assisted by Dr. Kamal Ishak, completes operation. Nurse Moyra Ramage adjusts the overhead light.

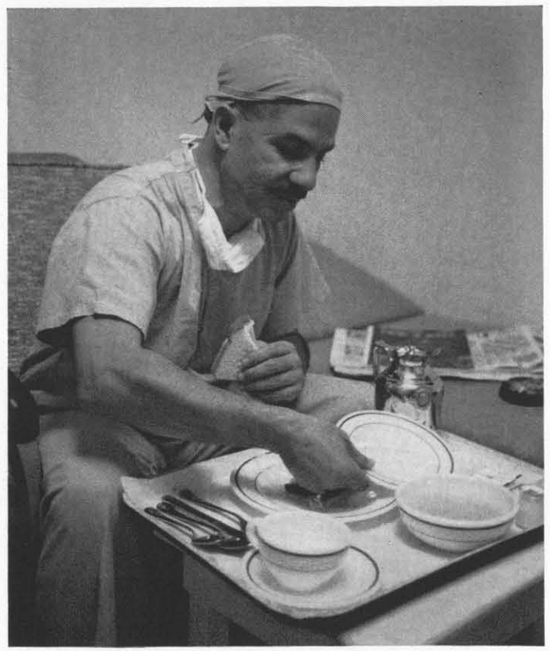
A DAY IN THE LIFE OF A SAUDI ARAB DOCTOR

It's a long day but one filled with the satisfaction of making people well for Dr. Fayik Abdi of the Dhahran Health Center

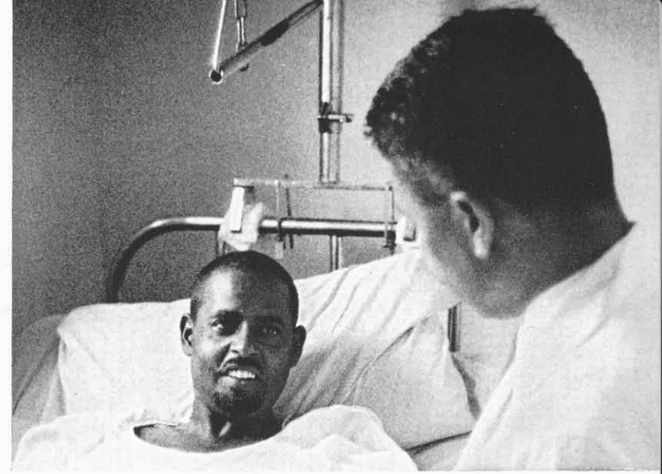
Dr. Fayik Abdi is one of seven surgeons on the staff of Aramco's $7.5 million Dhahran Health Center. The Surgical Unit in the 230-bed main company health center completes an average of about 3,400 operations a year. Since one member of the surgical staff is usually on vacation on a rotational basis, it works out that each of the other six performs nearly 50 operations every month. They also meet a full schedule of clinic appointments, see their post-operative patients in the wards at least once a day, and are on 24-hour call for emergencies about twice a week. Whatever time remains is for families and the hobbies that the doctors require for relaxation from their tension-filled working hours. Middle East and European-trained Doctor Abdi, however, shares with the medical profession everywhere a dedication to his calling that helps see him through his often arduous daily rounds.

A DAY IN THE LIFE OF A SAUDI ARAB DOCTOR

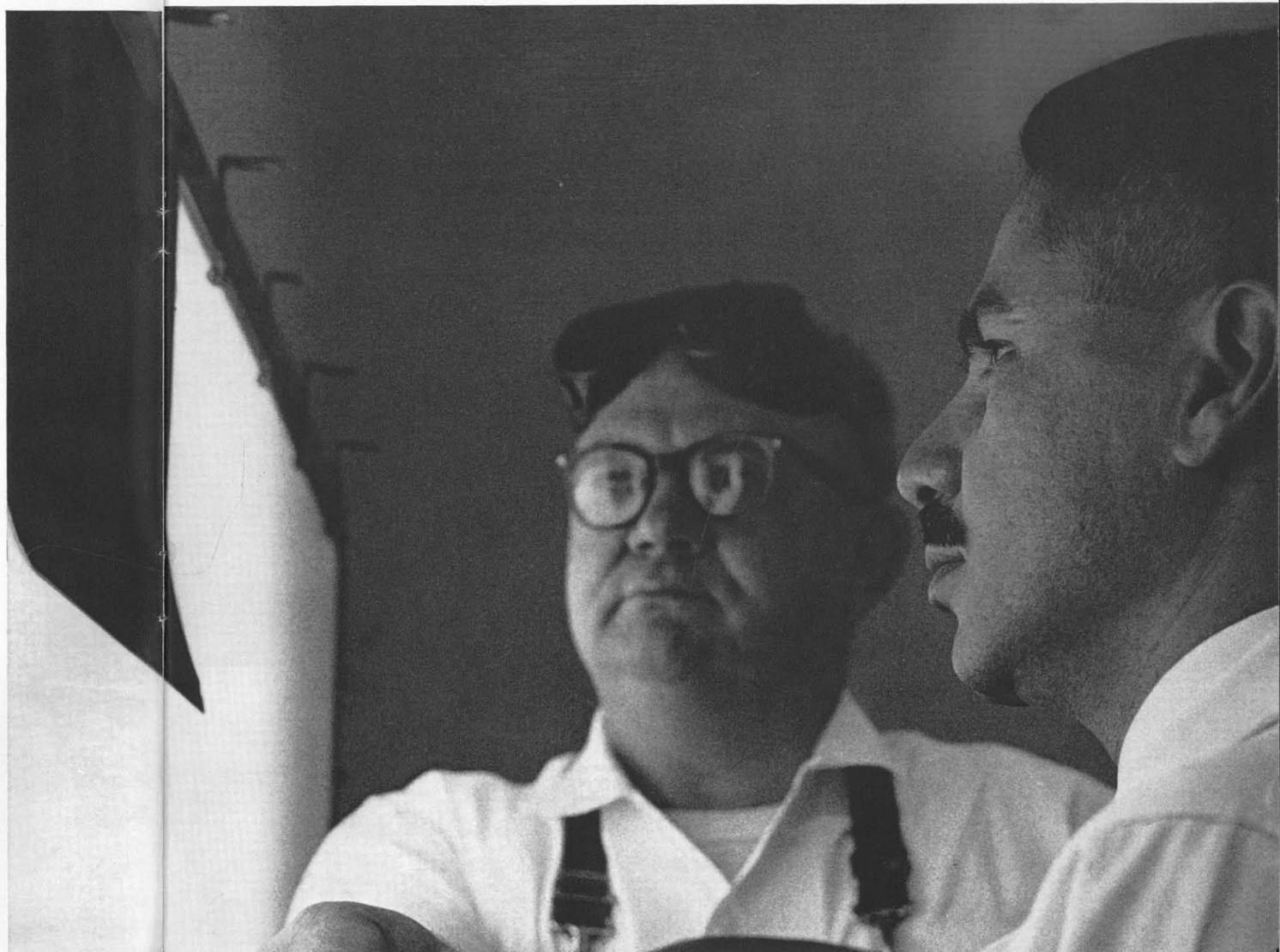
At 8 a.m. on mornings when he has operations scheduled, Dr. Abdi enters the scrub-room. Before beginning his careful scrub-up routine, Dr. Abdi watches a patient being prepared in operating room.



By noon, Dr. Abdi's operations are completed. He takes his lunch at the Health Center before starting out on his afternoon ward rounds.



In the Pediatric Ward Dr. Abdi and his wife Naimeh, a registered nurse, check a young boy's bandage. Seated around the table is a group of Aramco employees' wives who make regular visits to the Dhahran Health Center to help entertain hospitalized children. Later in the day Dr. Abdi, on his ward rounds, chats with an Aramco employee under his care and finds him in good spirits and showing satisfactory progress.

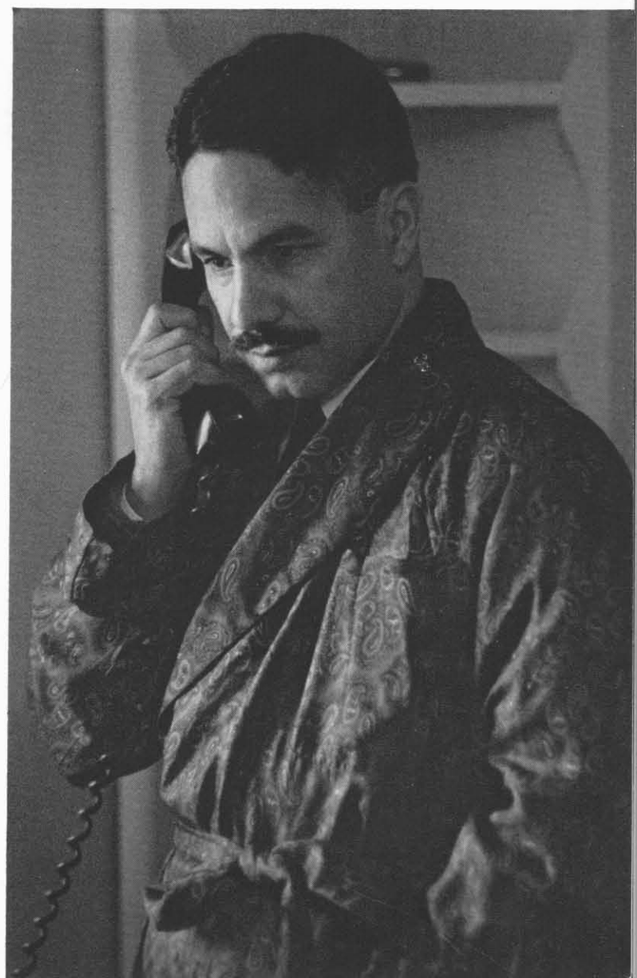


With Chief Radiologist M. C. Reinhard Dr. Abdi discusses a patient's X-ray, which he uses to help confirm his diagnosis.

A DAY IN THE LIFE OF A SAUDI ARAB DOCTOR

Photography by B. H. Moody

Just before their evening meal, Dr. and Mrs. Abdi play with their three sons. Two-year-old twins Rami and Osama admire the marksmanship of their big brother, Rifat.



The end of Dr. Abdi's long day finds him calling the night duty nurse at Dhahran Health Center for a final check on a patient's condition.

An American expedition, headed by Dr. P. C. Hammond, Princeton University, continued excavations at Petra, Jordan in 1961.

THEY "DIG" HISTORY

It's surprising how many pages of past ages archaeologists can read from a few fragments

On November 4, 1922 an English archaeologist named Howard Carter paused in his work of opening the tomb of the ancient Egyptian Pharoah Tutankhamen. The hole he had made was big enough to see through. Lighting a candle, he held it inside and squinted into the darkness of the ancient burial chamber while other members of the expedition waited anxiously.

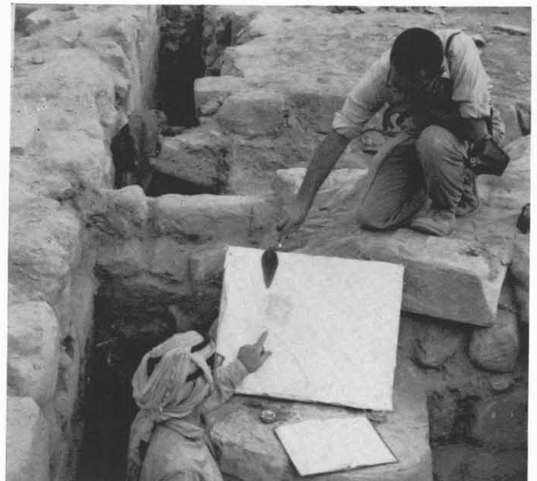
Lord Carnarvon, his associate, could wait no longer. "Can you see anything?"

"Yes, wonderful things!" Carter finally replied in a trembling voice.

Carter's words were a considerable understatement, for in the flickering light of his candle he could see the long-hidden treasures of an Egyptian king who had ruled over three thousand years before. The discovery was not only important; it was unique. Grave robbers had long since plundered every royal tomb they could find, Tutankhamen's escaping this fate only because its entrance was concealed under debris until Carter and Carnarvon discovered it forty years ago, with its mummified king still resting in his beautiful stone sarcophagus.

The tales of archaeology often describe the excitement of such a discovery but neglect to tell of the scientists' painstaking labor. Years ago the sun-helmeted and bearded archaeologist portrayed in movies really existed. He was actually more of an adventurer than an archaeologist, however, and he dug recklessly through ruins searching for golden cups, exotic statues and jewel-decked mummies. He gave little thought to the great bulk of material representing the common people of an ancient civilization – objects telling how they lived, what they made, how closely they might resemble modern man.

Today's archaeologist is different. Whether a "classical" expert who spends most of his time working in a museum studying and classifying artifacts, or a "digger" who is often in the field, the archaeologist has become a scientist who works with the utmost precision and modern instruments.



Each excavation is carefully planned before the digging starts. Charts and diagrams are consulted frequently by the team of archaeologists.

Archaeologists roam the world delving into man's past, but because the first civilizations were spawned in the Middle East many of their most dramatic discoveries have been made there. In the Fertile Crescent, the ancient lands watered by the Tigris, Euphrates and Nile rivers, man discovered the secret of agriculture and the domestication of animals. He laid aside his hunting bow and became a farmer and villager, and later built great cities. Throughout the Middle East the deep emotion felt by Howard Carter as he stood before Tutankhamen's tomb has been experienced by others. The famous archaeologist Botta felt it as he stood in the ruins of Assyrian Nineveh; Koldewey when he climbed the old walls of Nebuchadnezzar's Babylon; and Woolley as he dug among the broken pots and royal graves of Sumerian Ur.

The care required of the modern archaeologist, and his need of a basic knowledge of languages, natural sciences and cultures of different countries, have made the "lone wolf" searcher obsolete. Now when an expedition arrives at an ancient site in Iraq, Saudi Arabia or Iran, the archaeologist leading the party comes as the head of a group of experts in anthropology, geology, geography and other sciences. Some of the party must know surveying, photography, drafting and mechanical repair. And even with all the accumulated knowledge represented by the experts "at the dig," final reports on important finds must still wait until opinions have been heard from scientific specialists in museums and universities scattered around the world.

An archaeologist searches for the remains of ancient dwellings or villages with a trained eye and plain common sense. Caves can be rich in relics of pre-historic man, the banks of a river may reveal sites of old settlements, and even a broad plain might be studded with outcroppings of aged flints, pottery or bricks from buried towns. Many ancient Middle Eastern sites appear as nothing more than flat-topped hills with sloping sides, as a result of the ancient building methods that could not withstand centuries of weathering. For ages people built villages of sun-dried mud brick houses. As the years passed, rain weakened the roofs until they collapsed. Eventually the walls crumbled and windblown dust and sand swept over the abandoned houses and villages. Often new villages were built on top of ones which had been buried. The mound heaps up as the building, decaying and covering processes are repeated.

Drama still exists for the archaeologist preparing to excavate a mound site, but it is controlled by reason and scientific patience. Before an archaeologist tells his crew to begin digging he makes certain that all the broken pottery, flints and worked stones on the surface are collected and noted. Then the entire area is accurately surveyed, mapped and photographed. The hill is carefully studied by the experts in planning their excavation, for the slopes may give evidence of an ancient fortification wall, a major building or temple, or the location of a market place.

Excavation usually begins with the digging of exploratory trenches both on the top and on the sides of the mound. Holes about 12 to 15 feet square are started on the top, while step trenches, some 10 feet long on each step, are dug on the sides. These trenches allow the archaeologist to study the different layers of ruins, while the square holes on top tell him if his digging plan will bring successful results.

Digging is the job of skilled pickmen who use a short-handled, one-bladed pick in deftly cutting through the ruins. Heavy earth-moving equipment is of little value in archaeology for it would destroy more of the fragile past than it could unearth undamaged.

When pieces of pottery, flint tools or bits of bone are unearthed, they are carefully removed from the trench and placed in a basket which has been tagged for each individual pit. The finds are taken to a control area where they are washed, unless they are of unbaked clay or other material that washing would damage. The cleaned artifacts are then classified, the pit and layer from which they came are noted, reference numbers are given; finally they are catalogued in record books.

As the pickmen work deeper, the archaeologists may decide to abandon all but two or three of the exploratory pits to concentrate on the most promising. The entire staff is kept busy cleaning, brushing and sorting the objects as they are discovered. Some items are photographed or drawn with painstaking care, and pieces of broken pottery are reassembled into a complete jar, dish or pot. At the mound, the pickmen begin encountering house walls, rooms and even some furnishings. The experts work long hours guiding the diggers, photographing the cleared rooms and any impor-

A moment of excitement occurs with the discovery of a long-buried Hercules statue, which had occupied a niche in an arena-theater when the city prospered 2,000 years ago. Petra was a trading center between East and West.

Dr. Hammond examines a Greek inscription which was unearthed by his team.

THEY "DIG" HISTORY

tant objects just as they were left thousands of years before.

As more and more relics are dug from the earth, the mound begins to tell about the people who lived in the ruined villages. It is here that the archaeologist feels the antiquity of man as he focuses his knowledge and experience on the different finds. Flint sickle blades and kernels of domestic wheat and barley tell him that the people of the hill grew and harvested grain. Broken grinding stones speak silently of baking bread in ancient ovens. Bones show the kinds of animals the villagers raised and the meat they ate, while pottery adorned with intricate designs testifies to a love for beauty and a sense of form. Bone needles, graceful spoons, imprints of woven fabrics on clay and statuettes of animals and people all enable the archaeologist to recreate an accurate picture of what the villages must have been like when they were communities of working, talking, laughing people.

Objects found in ruins are sent to experts all over the world for further study and evaluation. In 1950-51, an expedition directed by Dr. Robert J. Braidwood of the University of Chicago's Oriental Institute worked at Jarmo in the Kurdish highlands of northeastern Iraq. At this now-famous site archaeologists uncovered proof that Jarmo was one of the places where man first gave up the life of a wandering hunter and settled down to farming and village life about 8,500 years ago. After the artifacts used by the Jarmo people had been studied by the expedition, many were sent on to other scientific men. Bones were sent to anthropologists in Illinois, pottery to an expert in Oregon, stone bowls to a petrologist. Charcoal dug from aged fire beds was examined by a Danish botanist for evidence of ancient plants, then by a wood expert at Harvard University for identification of the trees from which it came, and finally it was given radioactive carbon-14 dating tests by Dr. W. F. Libby at the Institute of Nuclear Physics at the University of Chicago. It is only after careful analysis of the excavation site, the surrounding countryside, and artifacts has been completed that the archaeologists who did the digging and their fellow scientists in allied fields attempt to give their new information about man its proper place in history.

Like Botta, Carter and Woolley in the past, archaeologists today continue to explore the long reaches of the Middle East hoping to find more evidence of early man and the rise of the first civilizations. While some continue to dig and analyze the pre-historic villages and caves near Jarmo, Iraq, or copy and study the hieroglyphic inscriptions on the walls of Egyptian tombs, others explore new sites. Archaeologists are busy at the ruins of the Biblical city of Shechem in western Jordan where the shrine at which Abraham may have worshipped was discovered in 1962. Iranian experts are digging at Marlik Tepe near the Caspian Sea in the royal graves of a previously unknown people. Scientists from the Universities of Cincinnati and Stockholm are studying the ancient wild animal life at the ruins of Troy, and others are inspecting the recently unearthed painted murals at Cetal Huyuk in central Turkey.

Archaeologists and other learned men from all over the world have joined in searching and studying our early ancestors so that modern man will know more of his history and be better able to understand himself.

IN SAUDI ARABIA... An archaeological survey team last summer completed a three-week expedition to ancient sites in northwest Saudi Arabia with the assistance of the Arabian American Oil Company and Tapline. The expedition covered almost 2,000 miles of trackless desert from Turaif south to al-'Ula and then followed a circuitous route back north to Turaif. Headed by archaeologists from the University of Ontario, Toronto and the American School of Oriental Research in Jerusalem, Jordan, the expedition was accompanied by Aramco and Tapline personnel.

Of special interest to the team was the period from about 500 B.C. to 500 A.D., during which two peoples, the Nabateans and Thamudenes, occupied the area. To date, very little is known about their cultures.

At Taima the team found ruins spectacular in size and extremely promising from an archaeological point of view. The site at Taima is so large that it will require many more expeditions and a number of years of laboratory, museum and library work to tell its full story. Some of Taima's ancient history is known. The Neo-Babylonian king Nabonidus conquered the city in 550 B.C. and during the eight years of his rule, the city developed into an important commercial center.

South of Taima, at Mada'in Salih and al-'Ula, the team investigated a series of rock-cut tombs and two ancient city sites. Evidence gathered there indicates that the structures were built by the same people who built the famous city of Petra, far to the north in what is today the Kingdom of Jordan. Traveling north, the expedition found several Thamudic inscriptions, as well as the ruins of a structure very similar to ancient temples in Jordan. Nabatean inscriptions were also recorded in the area.

The archaeological expeditions in Saudi Arabia will continue during the summer, 1963. ■

In the days of Islamic Spain,

one city made a bold bid

for much of the world's talent

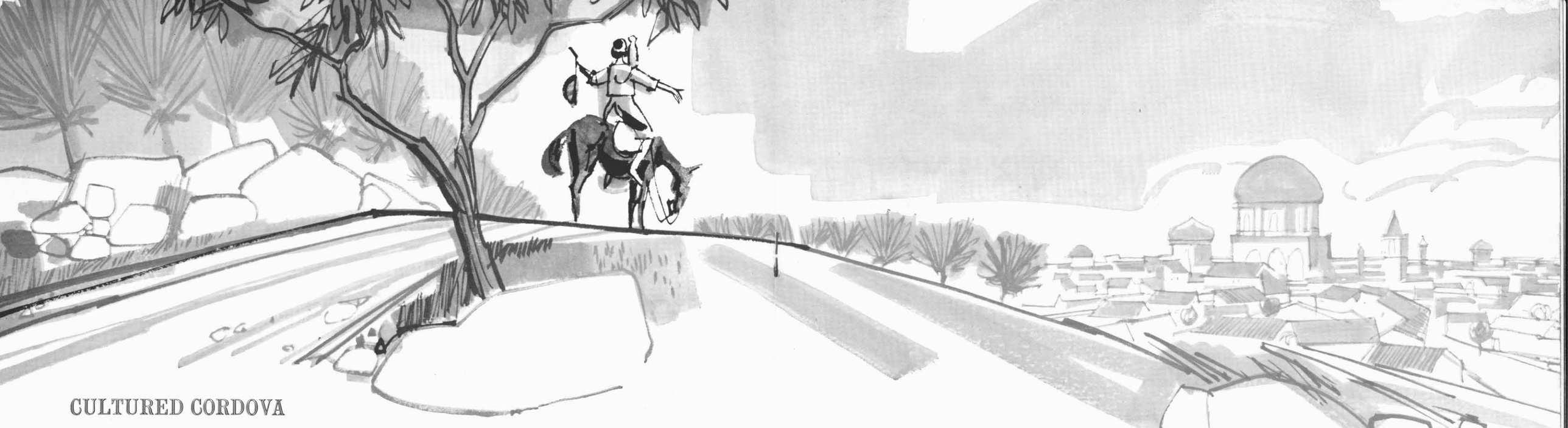
CULTURED CORDOVA

A RAFFISH FIGURE cantered down the dusty Spanish road to Cordova in the year 1120. His mount was an overage plow horse, his saddle a battered and discarded veteran of many military campaigns. On the right shoulder of his rough tunic perched a chattering monkey. In his hands he held a lute, and as he rode he strummed a melodious tune of his own devising.

The rider paused on the crest of a hill and smiled as he looked at the city spread out below, crowded with buildings, thronged with people. Grasping his monkey's paw, he said gaily: "My friend, you are gazing at fame and fortune."

An hour later they were in the bazaar of Cordova, and the simian acrobat was entertaining a circle of curious onlookers. The minstrel sang songs for them – lively, doleful, amorous, comical. The monkey passed the hat through the audience, chattering volubly as coins clinked into it. Then the interesting visitor called his monkey and disappeared in search of a lodging for the night.

This individual was one of the most colorful and most gifted personalities in Islamic Spain. His name was Ibn



CULTURED CORDOVA

Quzman, a wandering minstrel who became a great poet of Arabic literature.

Ibn Quzman was right in supposing that fame and fortune awaited him in Cordova, for there, more than any where in Spain or all of Europe, a poet and musician might hope to find patrons of his art.

Cordova was an ancient city before the advent of Islam. When the Visigoths came storming across the Pyrenees after the fall of the Roman Empire, they made straight for the lush terrain to the south. They found a strategic spot on the Guadalquivir River from which they could control the area. It was far enough from the mountains to be defended against other barbarian tribes, and far enough from the Mediterranean to be safe from marauding pirates. The river gave access to the sea. Armies could be quickly dispatched to every part of the province, and the land was fertile enough to support a large population.

Their power lasted until the year 711, when a Muslim army crossed over from North Africa and won a decisive victory on the banks of the Salado River. Flying columns fanned out in pursuit of the Visigoths. Cities and provinces were captured. Cordova resisted a siege for two months before it fell. Like the Visigoths before them, the Muslims understood the importance of the city on the Guadalquivir and made it the capital of their Iberian empire.

A decisive event in the history of that empire occurred in 750 far off in the Middle East. The 'Abbasid dynasty overthrew the Umayyad dynasty. The last of the Umayyads, Abd Al Rahman, escaped the fate of his family. He wandered through North Africa and made his way to Spain where he was accepted by the Iberian Muslims who remained loyal to the Umayyads.

Thus did Islamic Spain restore the Umayyad Caliphate, a political reality that became official when Abd Al Rahman III formally assumed the title of Caliph and the traditional designation "Commander of the Faithful." Soon the capital of Umayyad Islam, Cordova, rose to an equal brilliance with the capital of 'Abbasid Islam, Baghdad.

"Cordova is the jewel of the world," says a medieval German manuscript. Visitors from the trans-Pyrenean nations of Europe, whose homelands were struggling through the worst period of the Dark Ages, were astonished by the magnificence of the Moorish capital. They found a city of 500,000 inhabitants and 100,000 buildings – by far the largest metropolis west of Constantinople and north of the Mediterranean.

There were hundreds of mosques and public baths in Cordova. More striking to visitors, for whom books were rare and precious things, were the city's 70 major libraries – including one collection of 400,000 volumes gathered by the Caliph Al Hakam II. The paved streets contrasted with the dust and mud that would remain familiar irritations in Paris and London for centuries to come.

Dominating the Cordovan skyline stood the Great Mosque. Begun by Abd Al Rahman I in 786 and added to by subsequent rulers of Iberian Islam, the Great Mosque grew into the wonderful structure known today as the Cathedral of Cordova. Several modern writers have used the word "forest" in referring to the interior columns, an apt term since there are over a thousand of them supporting the huge roof.

The Great Mosque shows how skillfully the Moors employed the arch. They adopted the horseshoe arch of the Visigoths and made it so popular elsewhere that it has become known as the "Moorish arch." They are thought to have invented the system of intersecting arches designed to withstand the stresses and strains of a lofty roof supporting a massive cupola hewn from marble. This architectural principle was copied and widely used in the building of Europe's great cathedrals. The Europeans who learned about it in Cordova expressed amazement after walking through the galleries and the loges and the spacious courtyard of the Great Mosque.

Cordova also possessed its Versailles, 700 years before Louis XIV. Madinat Al Zahra did not survive the Middle Ages, but we know from the written reports of eyewitnesses that the royal palace on the outskirts of the city took 100,000 men and 20 years to build. It had 400 rooms and a Hall of the Caliphs featuring glass doors and alabaster windows. Here, overlooking colorful gardens and bubbling fountains, the lord of Islamic Spain held court, ruled his realm and took his ease.

The common people made their own contribution to the greatness of Cordova. Their native crafts became famous. Indeed, the English word "cordwain" comes from "Cordovan" and refers to the beautiful leatherwork that became admired throughout the civilized world. An English merchant of the time reported that the Londoners were "struck by leather as pliable as wool and as tough as horsehair, and marveled where I had found it."

The Cordovan craftsmen who worked with baked tile were equally adept. They turned out glazed cups, dishes and jars, all intricately decorated and brought to a glittering sheen that rivaled Chinese porcelain. Known to collectors as "Mudejar," the pottery of medieval Cordovan kilns still ranks among the most valuable on the market.

Spain's agriculture, too, was advanced by the Muslims. They constructed aqueducts and lateral pipes for irrigation. They introduced exotic plants that are now characteristic of Andalusia, including oranges, peaches and cotton. The typical "Spanish garden," as it is popularly called today, is actually a Moorish garden.

With wealth piling up in Cordova, the caliphs and their more opulent subjects turned to patronizing the fine arts.

Ibn Quzman, representative of the popular minstrelsy, wrote more than 300 poems, of which about half survive. Ibn Zaydun, a troubadour, developed highly-technical verse forms and saluted his native city with his poem "Cordova." The composer Ziryab perfected the lute and sang his thousand songs at the palace. The philologist Al Qali produced one of the first studies of the grammar of the Arabic language. The historian Ibn Hasan wrote his chronicle of Islamic Spain at the request of Abd Al Rahman III.

Cordova was also regarded as a center of philosophical thought with Islamic scholars such as Ibn Rushd studying and developing the ideas of the Greeks. Known in Europe as Averroes the Commentator, Ibn Rushd gave an important impetus to the medieval philosophical tradition that culminated in the scholarly accomplishments of Thomas Aquinas and Duns Scotus.

Ibn Quzman, the poet and minstrel, and Ibn Rushd, the scholar, both characterized ancient Cordova – a city still remembered for its color as well as its culture, long after Islamic Spain has vanished into history. ■

They may be entirely different, but "main" streets everywhere have a great deal in common

FAMOUS STREETS OF THE MIDDLE EAST

Amir Faisal Street, business center in Jiddah, Saudi Arabia, reflects growth of this Red Sea Port, believed first populated by Persians 2,000 years ago.

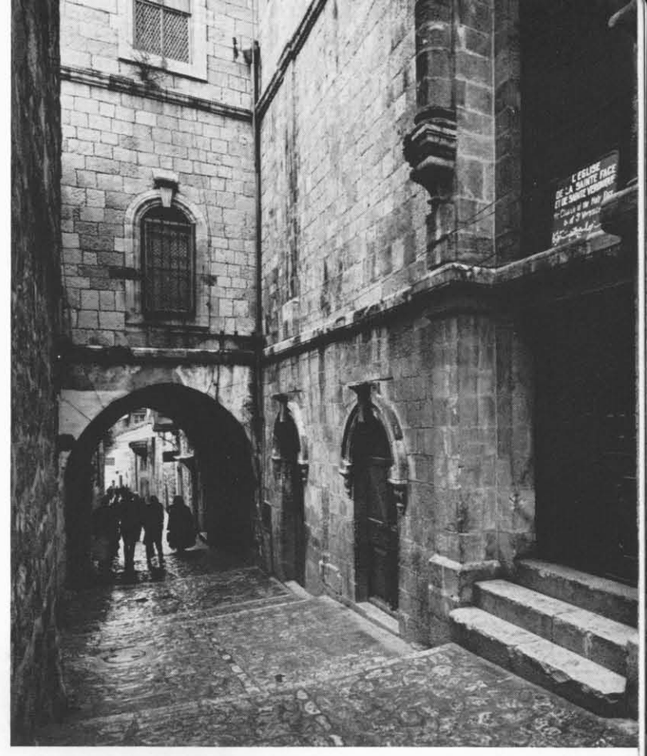
WHERE IN THE WORLD is a city that doesn't have its "main" street? Whether village or metropolis, wherever mankind had settled down and built cities, one street comes to be better known than any other. Sometimes "main" street is lined with shops crammed with delights for tourists and townspeople; sometimes it's the center of nightlife. It may be narrow and thronged with scurrying humanity, or or it may be a stately, tree-lined boulevard. Whatever its physical characteristics, it's the street that travelers always visit, the street that gets its picture snapped most often.

Of course, the larger the city, the more likely it is that several streets qualify for the distinction of being "main" streets. There are some who would say that New York's Fifth Avenue has several rivals, or that the Champs Elysees is not really the reigning heart of Paris. Maybe, but mention those street names, and the cities in which they are found immediately spring to mind.

How do "main" streets get their names? Examples of famous streets tend to prove that there's really no system. The Champs Elysees translates as "Elysian Fields," a peaceful vale for after-life. Berlin's Unter der Linden Strasse literally tells the story of a stroll under the street's linden trees. In Madrid handsome Avenida José Antonio takes its name from a dashing Spanish hero, but New York's Fifth Avenue is nothing more than a very ordinary numeral that's taken on elegance.

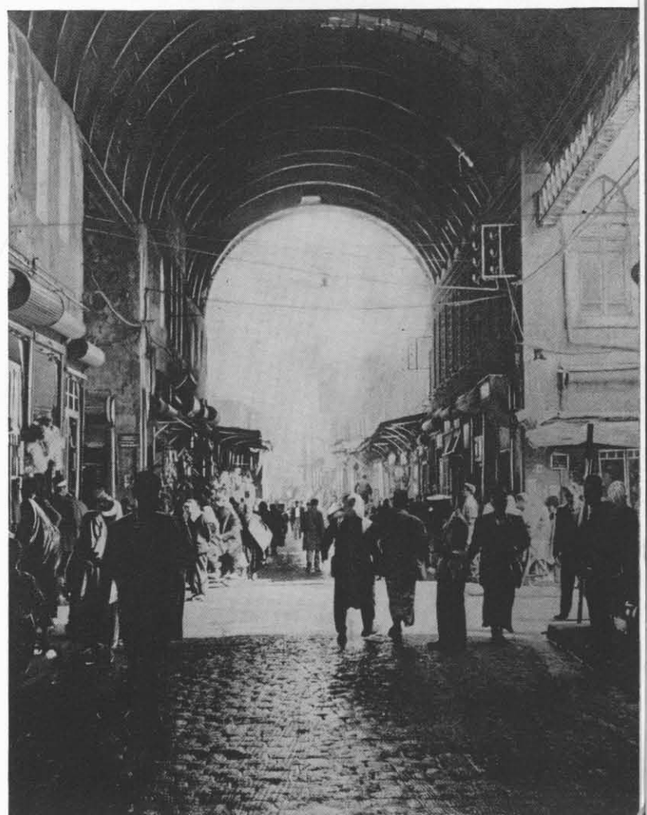
These streets are familiar to almost every Western ear, even to people who are confirmed stay-at-homes. But other areas of the world, such as the Middle East, have their "main" streets too, named like their Western counterparts for national heroes, or a physical property, or for reasons long lost in the centuries gone by. These streets are just as familiar to Middle Easterners as Fifth Avenue and the Champs Elysees are to Westerners. Many of these "main" streets are very old indeed, for it was in this area of the world that man built his first communities and thereby created city streets that were more than the rough pathways of a rural world. But many of the famous "main" streets of the Middle East have a decidedly modern touch, though below twentieth-century concrete and macadam may rest stones over which the city's commerce passed thousands of years ago.

Our picture tour presents but a few of the many "main" streets so well known to Middle Easterners and all those who have journeyed to that part of the world.

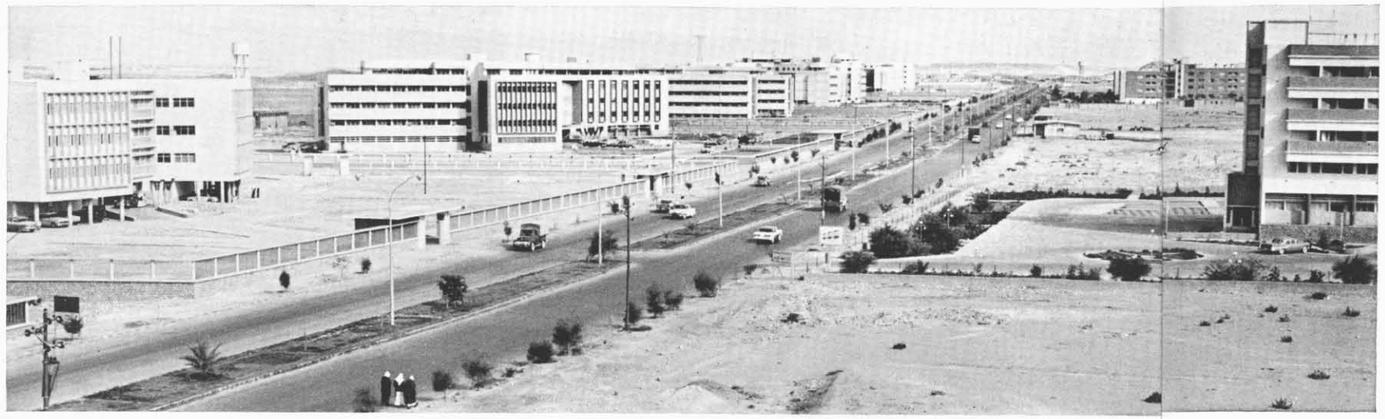


Every visitor to Jerusalem, Jordan wants to see the Via Dolorosa, which tradition says is the narrow street along which Jesus carried the cross.

"Street Called Straight" in Damascus, Syria was laid out by Roman town-planners 20 centuries ago. Covered sections offer all-weather bazaars.



FAMOUS STREETS OF THE MIDDLE EAST



In Riyadh, capital of Saudi Arabia, spacious al-Wizerat Avenue leads out of the city, past Government buildings, to the airport.

In Baghdad, Iraq, the Queen Aliyah Bridge,
at one end of Rashid Street, crosses the Tigris River,
a famous thoroughfare in its own right.

Fahad Salem Street, a broad, shop-lined boulevard in Kuwait Town, Kuwait commemorates a famous military action.

Some "main" streets no longer carry today's commerce. Only a tourist's imagination can reconstruct the crumbling glories of the stately Marble Street in Ephesus, Turkey. The street, which led from the city to its harbor, was lined with benches, fountains, imposing public buildings, and statues of Roman dignitaries.

No one has found them, but plenty of people have gone looking for

LANDS THAT NEVER WERE

In another april almost a century and a half ago, exactly 500 people received an unusual printed letter in their mail. Sent to all the members of Congress, the presidents of every American university and the heads of many of Europe's learned societies, it read:

St. Louis, Missouri Territory, North America
April 10, 1818

To All the World:

I declare the earth is hollow and habitable within; containing a number of solid, concentric spheres; one within the other, and that it is open at the poles twelve or sixteen degrees. I pledge my life in support of this truth, and am ready to explore the hollow, if the World will support and aid me in the undertaking.

I ask one hundred brave companions, well equipped, to start from Siberia, in the fall season, with reindeer and sleighs, on the ice of the frozen sea; I engage we find a warm and rich land, stocked with thrifty vegetables and animals, if not men, on reaching one degree northward of latitude 82; we will return in the succeeding spring.

Jno. Cleves Symmes
Of Ohio, late Captain of Infantry.

Although John Symmes' letter had a certificate of sanity attached, those who read it dismissed him as a crank. He never received the support necessary to locate and ultimately descend into the flourishing world he alleged was inside the earth. He was, however, able to earn a good living by lecturing on it, and when he died he left behind several barrels full of newspaper clippings concerning "Symmes Land."

A son, Americus Vespucius Symmes, also believed in the theory and tried for years to assemble his father's notes into coherent form. He finally had to give up, but an *Atlantic Monthly* article in April, 1873 revived and defended "Symmes Lost Land," and in 1868 Professor W. F. Lyons published a book on the subject titled *A Hollow Globe*.

The former Army officer's hollow earth theories were not unique; in fact they were quite in keeping with a long tradition of legends, claims and speculation about inner worlds. In epic poetry of the Middle East, the legendary Gilgamesh appears to descend into the earth on a visit to his ancestor Utnapishtim. Greek mythology of the classical period taught there was an underworld of the dead, ruled by Pluto, and that the divine smith Hephaistos had his workshop under the volcanoes. Plato, in his dialogue *Phaidon,* organized these beliefs into an impressive picture of happenings below. After stating that the earth was a sphere at the center of the universe – the first mention of the round earth doctrine in any writing–the ancient philosopher went on to describe illustrious "passages broad and narrow in the interior of the earth." The fictional writings of every age have reflected people's fascination with legendary lands – from the strange and exotic places visited by Sinbad in the pages of the *Arabian Nights,* to more recent travels by Jonathan Swift's Gulliver and by Jules Verne's heroes who found weird worlds not only inside the earth but on the moon.

That Symmes as a lecturer, though rejected by scholars, made an instant and enduring hit with the American public is not surprising. The "discoverers" of hidden lands, lost lands, and other lands of the imagination have always found spellbound audiences, and the tales that support their claims with conviction always find greater acceptance than arguments in refutation. People just naturally *want* to believe in romantic lands and legends.

Certainly the most "confirmed" of all man's fabled assumptions is the story of the "lost" continent of Atlantis. Though this land of glittering edifices and unparalleled culture has been variously located "just beneath the Azores," "directly east of Ceylon" and "actually in southern Sweden," it is still being looked for – and found – today. In fact, the legends of such lands seem to be more durable than the lands themselves. In 1938, a scholar estimated that a complete library of all the books devoted to Atlantis would exceed 1,700 titles, and the volumes are still coming out at the rate of two or three a year.

Any good list of other lost lands which were, and are, a long time in dying would have to include El Dorado, the fabulous city of diamond and gold streets sought in the interior of South America by the sixteenth-century Spaniards, Sir Walter Raleigh, P. H. Fawcett and even Theodore Roosevelt; Europe's Secret Kingdom of Prester John (inside its sapphire-roofed palace 62 dukes were said to wait on a solid emerald table set for 30,000 daily); the Fountain of Youth thought by Ponce de Leon to be in Florida but more recently, in 1948, "glimpsed" by a British and Norwegian team in the Himalayas; the Island of Lost Ships, a floating island of weed and wood believed for centuries to be at the center of the Sargasso Sea and inhabited by marooned sailors of all nations; and the missing Continent of Lemuria, placed by most "authorities" at the bottom of the South Pacific.

If dispelling an engaging geographic legend is difficult, trying to find out who started it is almost impossible. An example in point is the Lands of Ktesias story which hoodwinked all sorts of mapmakers, explorers, historians and entire nations for over 1,500 years. Even today many scholars erroneously accuse Ktesias – the physician to Artaxerxes II, Persia's king from 404 to 359 B.C. – with having invented the following:

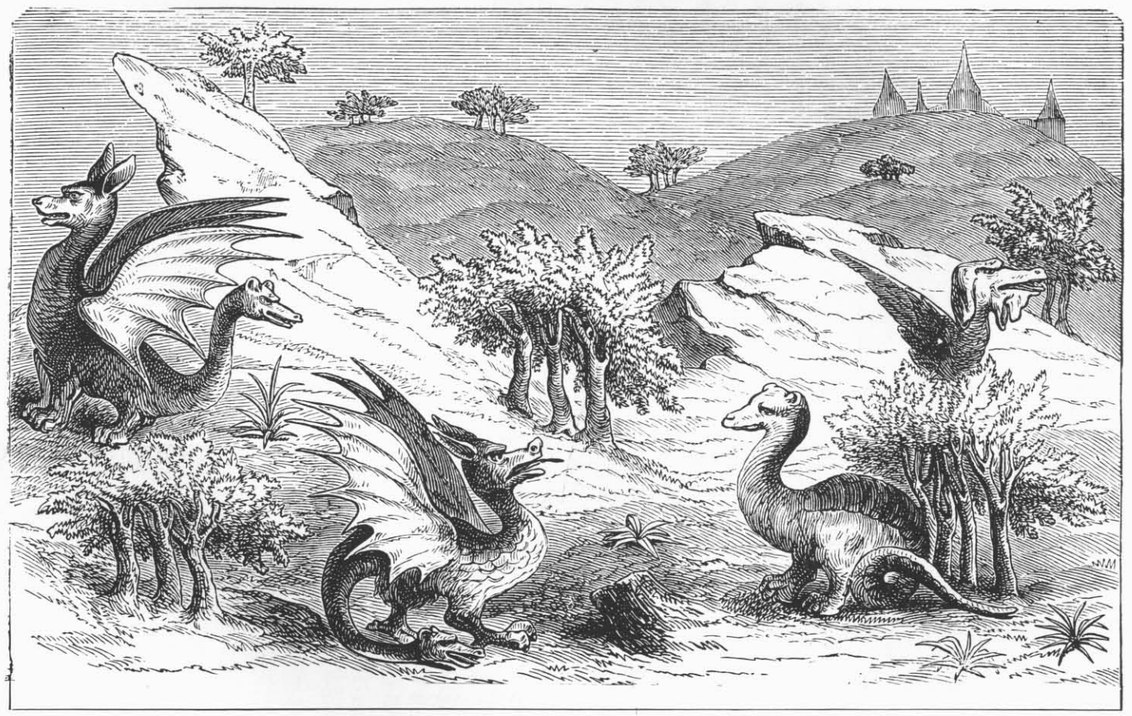
A glorious land near India possessing a fountain of liquid gold, protected only by a handful of fur-covered, yard-high Pygmies; a mountain filled with 120,000 dog-headed men, and horses which could shoot poisoned darts from their single forehead-mounted horn (in time someone named it a unicorn); a race of one-legged men who had the habit of lying on their backs and shading themselves from the sun with one over-size foot, and so on.

It was true the physician wrote a book on India and environs, based on tales he heard from travelers at the Persian court. But in 65 A.D., when Pliny the Elder set down his massive *Natural History,* he borrowed both heavily and carelessly from the Ktesias manuscript. The treacheries of translation, coupled with the Roman's uncontrollable urge to exaggerate, completely ruined Ktesias as a scientist.

Actually, the Persian physician had written not of Pygmies but monkeys, not of dog-headed men but tigers. His unicorn originated from Ktesias' honest and accurate description of the Indian rhinoceros. The creatures with over-size feet were actually some Indians with elephantiasis whom Ktesias had referred to briefly.

Once, like the sapphire-studded Kingdom of Prester John, much of the world was a mystery. Now, centuries of science have filled in our knowledge of the earth to the point where extremely little of it is really unknown. Gradually, almost all the wonderful lands of legend have been first whittled down and finally pushed off the globe altogether. *Some* legends, however, have been proved true. The fabled, jewel-bedecked city of Angkor Wat was indeed found beneath a Cambodian jungle. Also found were the actual ruins of Babylon, the Mayan cemeteries of buried gold, the breath-taking Victoria Falls, Peru's Machu Picchu and the ornate yet austere capital of Tibet.

Yet in this contemporary, fact-conscious age it has to be conceded, perhaps a little sadly, that even the most alluring of the "lost" lands and "hidden" civilizations simply never were – except in the writings of some imaginative men and in the minds of others who wanted them to be right. ■



A never-never land "somewhere in the East" and populated by winged creatures was described by John Mandeville in 14th century.

Petroleum's Private Parlance

In the lingo of the oil fields, a "junk basket" is used to catch "fish"

IN THE EASTERN PROVINCE of Saudi Arabia, where the Arabian American Oil Company has its oil operations, a *tool pusher* might ask several *roughnecks* about some *joints*. To those unfamiliar with oil industry parlance, these words and terms, and others in daily use by oil men, would be incomprehensible.

But among oil workers, the man called *tool pusher* is readily identifiable as the drilling foreman, the *roughnecks* he spoke to are the men who work on the derrick floor, and the *joints* he referred to are 30-foot sections of pipe.

The oil industry, like every major industry, has its own private language—thousands of words that describe equipment, personnel and industry procedures far more colorfully than any dictionary.

It's a growing language, one that's ever changing, depending on the time and place. Oil terms in use today by Aramco employees in Saudi Arabia are not necessarily those used in Texas, although many words run throughout the industry wherever it is found, and the changes in the lingo since the first commercial well was drilled on a Pennsylvania hillside more than a century ago have kept pace with changes in technology.

The rugged crews who manned the rigs had little schooling in the early days, and the words they used to describe the tools of the trade did not come from textbooks. Many terms had a live, imaginative quality that made an outsider feel he was actually seeing the great rigs bringing up the thick black crude.

You caught the fever of the oil strike days that sent fortune hunters streaming to the Oklahoma plains and the Texas/Louisiana Gulf Coast when you heard glowing ac-

The *crow's nest*, at the top of the rig, is over 130 feet above the ground. Halfway down is another platform called a *runaround*. In foreground are sections of drill pipe known as *joints*.

At bottom of the rig on the *drilling floor*, a crew of *roughnecks* works around the *rotary table*, which rotates drill pipe and bit like a carpenter's drill. At right is the *tool pusher* (drilling foreman).

Petroleum's Private Parlance

counts of an *oildorado*—a term taken from Eldorado, legendary city of wealth, to describe a region rich in petroleum.

You felt the elation that swept the fields when someone brought in a *gusher,* a lucky strike that sent oil spouting up from the depths of the earth in a black geyser pluming high above the derricks. You shared the bitter frustration that came when crews found only a *duster* or *dry hole,* scornful names for drilled holes yielding no oil. And you sensed the peril that lurked in every new well when oil men spoke grimly of a *blowout,* the violent release of a gas pocket that could send drill pipe or drilling cable and bit hurtling skyward, blown out of the hole by gas pressure.

The drillers used words they knew to describe equipment and processes they didn't quite comprehend, and the terms that emerged were usually more accurately descriptive than the fancy titles employed by the experts.

To the boy-turned-driller, the probe tools used to retrieve equipment lost in a well became *fishing tools,* and whatever was lost was known as a *fish.* Fishing tools include *overshots, junk baskets, sockets,* and *spears.* The belt against which the sweating derrick man strained as he worked on the drill pipe was called a *belly buster,* and the buried log or rock employed to anchor down a twanging guy wire came to be known by the somewhat macabre title *dead man.*

The many-armed complex of flow connections and valves that kept a well under control was known as a *Christmas tree.* And the driving force of the huge wooden wheel which geared power from the engine to the drilling line came alive when men talked of the *band wheel.*

The workers described themselves in blunt but picturesque imagery. Before the turn of the century when wells were drilled with primitive cable tools, the crewmen were known as *toolies.* After 1900, with the advent of the rotary rig, they called themselves *roughnecks* if they worked on the derrick floor, *derrickmen* if they worked above in the rig.

The pioneers of petroleum land adopted—knowingly or not—most of the classic devices of metaphor in developing their lingo.

Making an attribute do duty for the whole, they used terms like *mud-smeller* or *rock-hound* for a geologist testing dirt for the presence of oil and *shooter* for the man who in the old days dropped a charge of nitroglycerine to clean a clogged well. Today *shooter* is applied to the member of the seismic exploration team who handles dynamite.

Another technique was to substitute figures of speech for literal descriptions. Thus crude oil was labeled *black gold,* and the man-sized upright beam used to break the fall of the seesaw apparatus driving the drill usually was called a *headache post.*

Vivid verb phrases were employed to depict the operation. *Hitting the pay* meant to strike oil-producing sand; to *spud in* covered the initial starting of the hole from the surface after the rig has been "moved in," and to *skid* the rig was the order to shift a derrick.

A *shooter* (left) prepares detonating equipment that will set off dynamite charge. Shock waves from the subsurface blast will be recorded by sensitive geophones known to *seismographers* as *jugs*

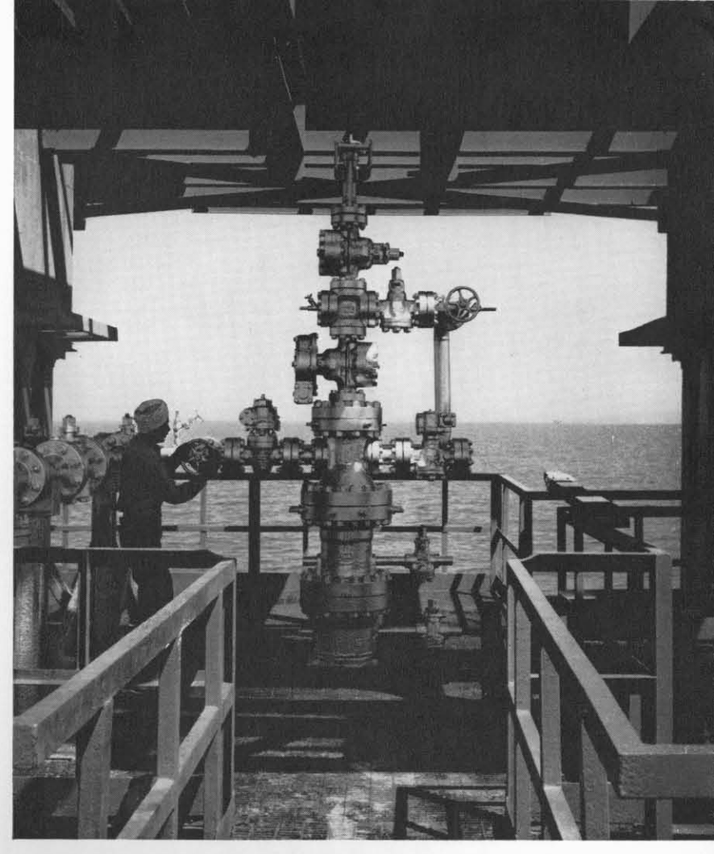
A certain cynicism crept into the terms used to portray familiar figures in the field.

One who drills wells in the hopes of finding oil in a territory not known to be an oil field was called a *wildcatter*—one who prospects out where the wildcats howl. *Oil witch* was the name applied to the diviner who made money in the days before geologists by walking the fields with forked stick in hand waiting for the prongs to dip where oil lay beneath the ground. He was also called a *doodlebugger* because the prongs of his stick reminded workers of the horns of an insect.

Because oil men worked long hours outdoors, it might be suspected that their healthy appetites caused food terms to pop up in their work. *Soup* stood for nitroglycerine; *eggs* for charges of dynamite; *macaroni* for small diameter pipe; *tabasco sauce* for the red acid used to dissolve the limestone through which a well was drilled; and *apple butter* for the thick dressing on engine belts.

In the early days the porridge-like mixture dredged up when the bit bored through sand, limestone and shale beds came to be known as *buckwheat batter,* and the samples of rock formation carved from a well much as breakfast cakes are cut from dough were called *biscuits.*

Just off the coast of Saudi Arabia, in the Persian Gulf, a *Christmas tree* is adjusted by an Aramco employee. The complex arrangement of valves and flow connections regulates the rate at which crude oil is forced to the surface.



Max Steineke was a pioneer *rock-hound* (geologist) for Aramco in Saudi Arabia. He led many geological explorations that preceded drilling operations.

Oil men have also borrowed heavily from the language of the sailor to describe their operation.

Aboard a ship, for example, the *crow's nest* is the lookout platform at the top of the *mast.* Oil hands use *crow's nest* to describe a platform which serves as a base of operations at the top of the derrick. At sea, a *marlinspike* is a sharp steel tool that joins or splices ends of rope. *Roughnecks* use the same term for the tool employed to splice wire. When a sailor goes over the side of his vessel, he uses a *Jacob's ladder.* A drilling crew also has a *Jacob's ladder*—an upright pipe with rungs attached to each side, and a two-legged pole supporting drilling equipment is labeled a *mast.*

Sometimes the same terms are used by seamen and oilmen, but with different meanings. To swab down a ship's deck is to mop it, but *swabbing down a well* means to remove oil and water from the hole. And in oildom *windjammer* doesn't mean a picturesque sailing vessel, but a worker who talks too much.

The reason for the parallel in nautical and petroleum terms has never been definitely established, but some historians suggest that the discovery of oil in 1859 lured many unemployed seamen to Pennsylvania to get in on the boom. The word *boom,* incidentally, was originally an oil field term referring to a petroleum-rich region.

With the development of offshore oil prospecting and the fleet of drilling ships that probe the bottom of the Gulf of Mexico and other coastal waters in quest of pay sand, the nautical influence is becoming even more pronounced.

Petroleum men call the Gulf of Mexico area, where drilling a wildcat well can cost millions, the *Blue Chip Sea.* And the bays and bayous of Louisiana and Texas where the offshore rigs cluster are known as *whale pastures.* This refers, however, not to the big sea mammal, but to the earliest days when an oil gusher was called a *whale.* Helicopters that range over the Gulf carrying men and equipment to the rigs are called *sky hooks* because of their ability to hover over the target without moving.

Seismographer is the term used to describe a relatively new breed of oil man. These hardy scientists who employ seismic instruments slog across open lands from Alaska to Saudi Arabia, drilling holes and setting off dynamite blasts to produce artificial earthquakes. Shock waves from the man-made quakes, picked up by geophones known as *jugs,* help the seismographers map subsurface structures.

As the oil industry changes with the application of new equipment and new technology, so will its private parlance change. A *derrickman* who retires this year would find himself hard-pressed to understand the lingo in use at a derrick site 25 years from now. Chances are, though, that he'd still find a crew of *roughnecks* hard at work. ■