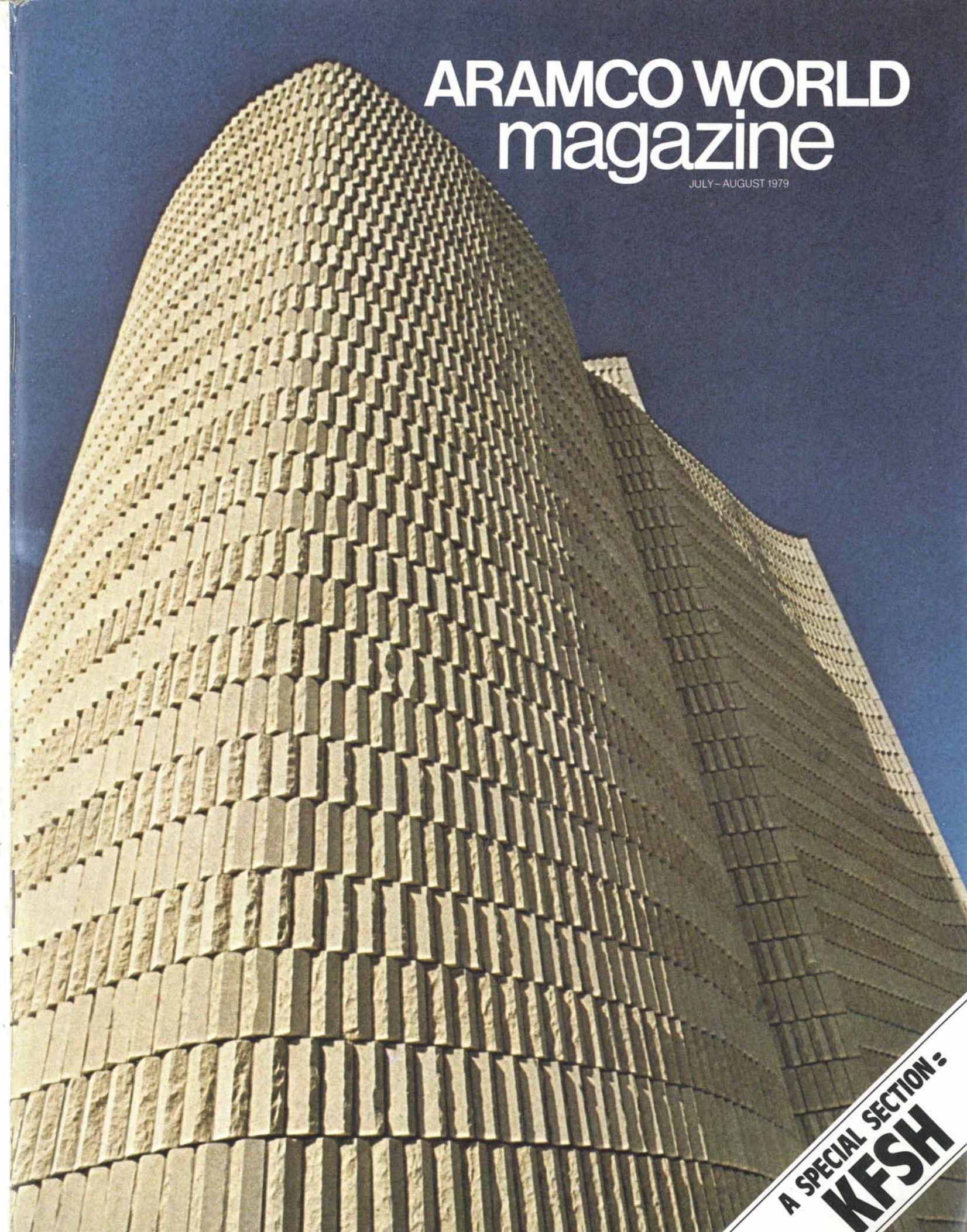


# ARAMCO WORLD magazine

JULY - AUGUST 1979

ARAMCO WORLD  
magazine

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A SPECIAL SECTION:  
**KFESH**





# ARAMCO WORLD magazine

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By Rebecca Bruns

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Cover: The high, patterned, curving facade of the King Faisal Specialist Hospital, built of locally-quarried stone, is a striking landmark on the outskirts of Riyadh as well as a medical milestone for Saudi Arabia. The architecture suggests the modernity of the medical care available to critical cases in this new, computerized center for advanced medical care. A cyclotron-equipped cancer research center will be opened next year. Photograph by Terry Webb. Rear cover illustration by Neville Mardell.

◀ Focal point of the hospital's lobby is a mosaic portrait of King Faisal made of lapis lazuli of different shades. Hospital offices line the gallery.





# Arabian Nights and Art Nouveau

WRITTEN BY REBECCA BRUNS  
ILLUSTRATIONS FROM HODDER & STOUGHTON LTD., LONDON, PHOTOGRAPHED BY REBECCA BRUNS.  
REPRODUCED BY COURTESY OF THE ESTATE OF EDMUND DULAC.

**S**cheherezade herself must have appeared to Edmund Dulac. In a dream, perhaps, in which she kissed his eyelids. Where else could he have learned to see the things he saw? Faraway places. Exotic peoples. The mirages of domed and minareted cities. How else could he have known the look of an Eastern paradise? The curl of the last tendril blossoming in an Arab courtyard? The tilt of a crescent moon?

And he did seem to know. Whole generations saw his paintings and agreed, "Yes, this is what the East must be like" – and dreamt of it themselves.

Not many people remember Edmund Dulac any more. Like Kipling in literature, time and fashion have passed him by. But in the early 1900's, the name Dulac won instant nods of recognition and enchanted sighs of approval. For Dulac was one of turn-of-the-century Europe's most celebrated illustrators – with a special distinction. In a day when elves, fairies and Arthurian knights filled England's books, Dulac put readers on a magic carpet and showed them his visions of the enchanted world of flying horses and magic lamps that in softer times beguiled the West. At his peak, Dulac's publishers couldn't get enough of him – and he couldn't get enough of the East. Even his



illustrations for European stories – "Beauty and the Beast," or "The Little Mermaid" – borrowed details from the East: turbans, turned-up

slippers, pointed arches, Moorish mosaics and courtyards, and oases set against starry desert twilights. Though he didn't even set foot on Eastern soil until years after his first illustrated tales from "The Thousand and One Nights," Dulac portrayed that world of myth and legend as if he'd been born in it.

In fact, he was born in Toulouse, France, in 1882. He didn't show any exceptional artistic bent until the age of 15. By the time he'd decided he wanted to be an illustrator, his parents had packed him off to law school. The career of an artist, they said, was financially precarious.

But Dulac had made up his mind. He studied art on the side and quietly plotted his escape to England – where the 19th century was greeting the 20th with technological and stylistic breakthroughs: color printing processes and, an outgrowth, the lush and lucrative Art Nouveau that turned the books of the day into treasures to keep forever.

As rumors of the lively London art world drifted across the Continent – the fame of Aubrey Beardsley, Charles Ricketts and Arthur Rackham – Dulac prepared to migrate. He studied English, adopted spats and a cane, and changed the spelling of his name from the French "Edmond" to the English version with a "u." And

**"Yes, they said,  
this is what the East  
must be like--  
and dreamt of it  
themselves."**



although he quit law school and won a scholarship to study art in Paris, his heart looked toward England. Classmates nicknamed him l'Anglais, and that suited him better.

At last, he crossed the Channel, portfolio in hand. It was 1904 and he was 22 years old, unknown and ambitious. Yet three years later, l'Anglais had become the famous "Arabian Nights Man," the man behind 50 dazzling little watercolors unlike anything even he had ever done before. Those paintings raised him to prominence almost overnight.

They also established the Dulac style — decorative, diminutive, rich in detail and in storytelling content. Persian miniatures, which constitute some of the most resplendent manuscript illustrations in all of art history, can also be described by those same adjectives — and indeed, Dulac always admired Persian miniatures, and in general favored Eastern art over Western. He was part of the Art Nouveau movement and certainly a product of his time, but his work owed a great debt to the art of India, China and especially Persia. Unlike his contemporaries, who played up the sinuous, naturalistic lines that are Art Nouveau's hallmark, Dulac emphasized design, color and texture. Like his Eastern counterparts, he was a master at

evoking atmosphere, if not action.

One of his favorite tricks was dropping jewels into a picture to make it shimmer. His skies and walls are studies in marble and opal; the foreheads and fingers of his characters are lit with tiny dots of light, like pearls or diamonds; the edges of wings, books, pots and leaves glow with the brilliance of rubies, amethysts and jade. Though the subjects he illustrated ranged from novels by the Brontë sisters to the poems of Edgar Allan Poe, Dulac painted more pictures on Eastern themes than any other kind. Some of his last paintings, in fact, were magazine covers based on the Arabian Nights — a theme he returned to time and again during

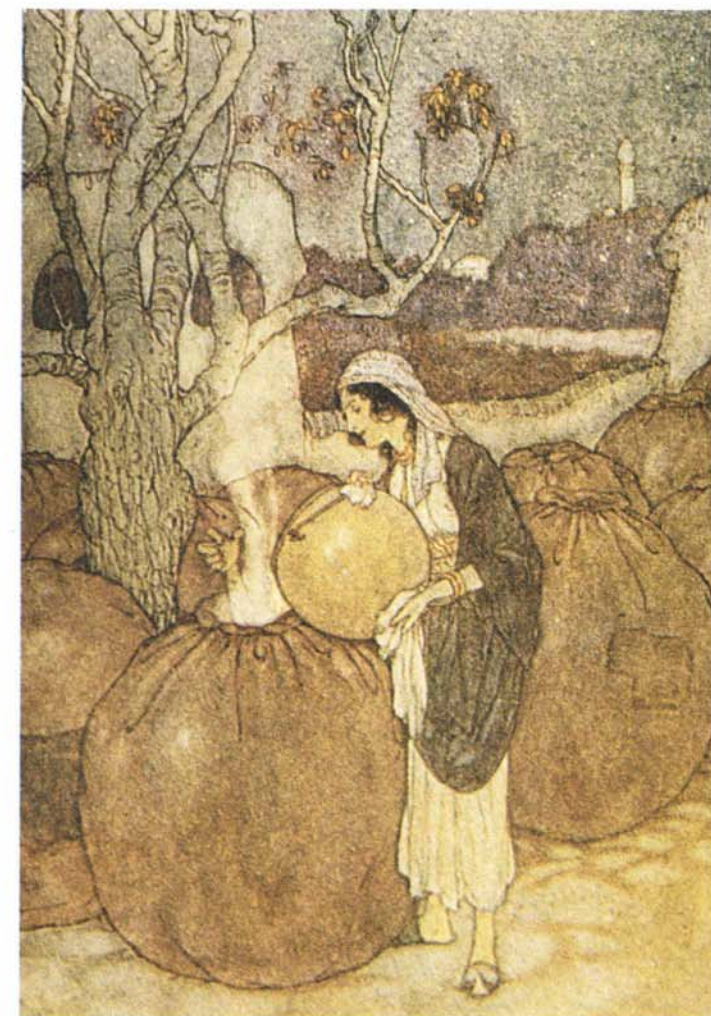
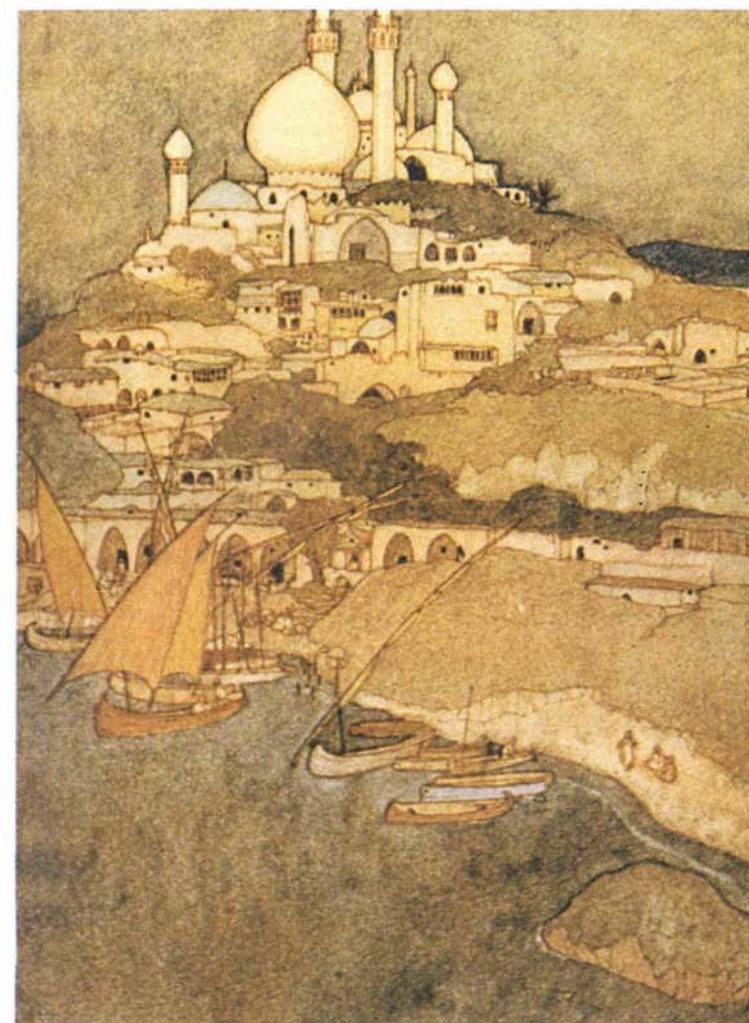


Above: One of the last of 107 covers Dulac painted for the New York magazine *American Weekly*; in style and theme, Dulac's love of Persian miniatures is visible. Opposite, four of his romantic illustrations for *Stories from the Arabian Nights*, from "The Princess of Deryabar" (top left), "The Fisherman and the Genie" (top right), "The Magic Horse" (bottom left), and "Ali Baba."

his 44-year career, in a total of 99 paintings. Even when commissioned to decorate the Royal Albert Hall for a ball, he played his famous trump card, and transformed the hall into a glittering vision of Aladdin's cave.

Yet it was only after his first set of illustrations for the *Arabian Nights* was behind him that he set out to visit the Arab East. Before that, he must have immersed himself in intimate study of the culture — its costumes, street scenes, domestic life, architecture, landscapes, textiles, ceramics, carpets and endless accoutrements — to give his illustrations authenticity. The trip itself, the justification of his vision, was his first beyond France and Britain. It was 1913; he was 31. Before him were the shores he had visited only in his mind, but his arrival there represented a homecoming. It was love at second sight.

In his journal, he carefully recorded every detail, from "the flat roof, palms [and] cubes of all shades of white, blue and ochre" to the "baggy breeches with short stockings and sometimes white or yellow top-boots, wide belts and stomachers... flowered shirt with kerchief around the head..." In Tunis, the illustrations that had made him famous seemed to spring out from every corner of the suq:







merchants sitting cross-legged in their niches, Bedouins wandering up the alleys, the tantalizing patchwork of fabrics, odors and Islamic decorations.

"Dulac experienced the joy of arriving at the source of his material," writes Colin White, his biographer. "He made a number of costume sketches, noting especially the women in their yashmaks... and the well-shaped eyes 'with eyebrows joining artificially' (a detail he later incorporated into his illustrations). He saw his first muezzin... and enthused over 'the cooks, the sweetmeats and their curiously fat vendors,' [and] the girls in baggy pantaloons... a scene which he worked up into a brilliant watercolor..."

In his next books, "Princess Badoura" (the last of Scheherazade's stories) and "Sindbad the Sailor and Other Stories from the Arabian Nights," Dulac's great trip comes through in a brighter color scheme, greater attention to details and patterns, a flatter perspective and a general symbolic mood – also the result of Dulac's increasing interest in Persian miniatures.

Persia arrived at these artistic elements just as Dulac did, by assimilation. Centuries of conquest and trade had brought many cultural influences from Byzantium, Syria, Abyssinia, Egypt, and China. Stiff,



stoic Byzantine people stare from some miniatures; delicate, curling Chinese clouds drift through others. By the 14th century, some of the most gorgeous paintings ever conceived were illuminating literary and scientific texts in Persia, Turkey and Mogul India.

His exposure to Persian miniatures had had a marked impact on Dulac's illustrations, and had inspired him to explore calligraphy. Even in some of his first sketchbooks, dating back to his student days in France, Arabic letters dance beside their French equivalents. Over the years, he taught himself to write Chinese, Hebrew, Persian and even Malagasy with elegant facility. He could also turn out Japanese watercolor paintings, Gothic "woodcut" drawings and Chinese brushstroke sketches as graceful as the styles they imitated. To complete the effect, he often signed his name in exotic script.

Calligraphy and abstract design together form the core of Islam's artistic heritage, and it is this aspect of Islamic art that subtly entered the Art Nouveau movement, by way of the arabesque line. Art Nouveau's prolific ornamentation, too, has a lot in common with the profuse decoration that, hundreds of years earlier, was adorning all facets of Islamic art, from the empty spaces of manuscript margins to ceramic bowls, the tiled walls of mosques and the woven expanse of carpets. (See *Aramco World* November – December, 1978; July – August, 1977; May – June, 1976).

Unfortunately, Dulac never combined his lovely and complementary talents into a book – although the prospect appealed to him immensely. Around 1918 he requested from his good friend, the Irish poet W. B. Yeats, specific suggestions for "something very delicate, with flowers, birds and insects." Dulac dismissed St. Francis of Assisi as his theme, and briefly considered doing a book on the life of the Virgin Mary. Maybe the range of possibilities was too vast, for Dulac was never a fast worker, and equally slow in his deliberations. We can only guess what other themes passed through his mind, but in the end nothing ever came of them – the unified work that might have been Dulac's magnum

*Opposite, an illustration in Japanese style from Edmund Dulac's Fairy Book, a 1916 collection of stories from many countries. This illustration is for "Urashima Taro," a Japanese tale; "Urashima was so enchanted that he could not speak," ran the original caption. Above, a portrait of the Princess Badoura, from the 1913 book of the same name, combines Chinese, Japanese and Persian elements.*





**O**NCE UPON A TIME, a very long time ago, in a Wonderland Kingdom, there lived a King. His name was Dodon. In his youth he had been a mighty warrior and fought many great battles against the King of the North and the King of the East and the King of the West and had beaten them all. And if there had been a King of the South he would have fought him also and beaten him. But in the South there was the sea. Sometimes, however, his enemies from the East and from the North came by way of the Southern Sea and tried to land on his shores. But King Dodon had a powerful fleet and always sank all their ships. And as years went by they ended by believing he was invincible. They no longer dared attack him and went in great fear of him.

So King Dodon lived in peace and the older he grew the more he liked peace. The thought of battle filled him with weariness and he wished for nothing but quiet and happy days with good food and

opus was never created.

Despite this, Dulac, and the Art Nouveau style itself, took more than one cue from the East in the art of book making. Book production in the Islamic world was a full-scale industry. According to an Arabic manuscript in the National Library in Vienna, it involved nine separate branches of craftsmanship besides calligraphy: painting, leafcutting, gilding, drafting, binding, preparing the gold-sprinkled paper, designing of lined borders, restoring of old manuscripts, and assembling of albums. Even with machines doing much of the work, Art Nouveau books required the same meticulous craftsmanship from their illustrators, printers, binders and assemblers, and the lavishly illustrated "gift books" that came out at Christmas time demanded still more care. They were often the size of dictionaries, bound in calf-skin, with gold-embossed covers, heavy vellum pages, and illustrations tucked like little masterpieces behind sheets of tissue.

Dulac was always this meticulous, insisting on perfection in the way he worked and in the finished product. His drawing desk was fastidiously arranged, with never a stray pen or a streak of ink. Like the Islamic masters, who often drew from precise formulae, Dulac clung to a code of his own, working

To illustrate a 1950 edition of the great Russian poet Alexander Pushkin's tale "The Golden Cockerel," Dulac turned to the flat surfaces of color, the ribbons of ornamentation and the static symmetry of Russian folk art. Opposite: The opening page of Pushkin's story, with Dulac's ornamental headpiece, title, initial letter and page layout. Below: One of the inside illustrations for the tale.

up his illustrations, like them, from transparent sketches that could be overlaid and shuffled around until the exact composition materialized. Like Islamic illustrators, who prided themselves on using the most flawless materials, Dulac chose the cream of imported Japanese papers to enhance his satiny tones and textures. Bookcovers, inside page decorations, headings and borders rolled from his brush. For one of his later works, Alexander Pushkin's "The Golden Cockerel," he even devised mockups of the pages, with instructions for placement of text and designs.

In "Au Royaume de la Perle" (The Kingdom of the Pearl), a nonfiction book on the history of pearls, Dulac painted swirling silver and gold washes over many of the watercolors, an idea prompted by Persian manuscripts. This



technique made reproduction difficult and restricted the book to a limited printing, but the 10 miniatures were critically acclaimed as "gems of their kind." The Pearl paintings more closely resemble Indo-Persian miniatures than anything else Dulac ever did, and they were also his last illustrations in the gift book genre. His biographer calls The Pearl "the swan song of the gift book, and there could not have been a more splendid finale."

What was Dulac's legacy to the future? Diane Klemin, in "The Art of Art for Children's Books," answers from the illustrator's point of view: "... the present renaissance of children's book illustrations began with the [early 20th-century] picture book... Today [some artists] illustrate with the brilliance, scope and spirit of the late Edmund Dulac, Howard Pyle, Arthur Rackham and N. C. Wyeth."

Yet Dulac was not primarily an illustrator of children's books. It is certainly true that most of his work did spring from fantasies: the three Arabian Nights books, "Sleeping Beauty and Other Fairy Tales" in 1910, "Stories from Hans Andersen" in 1911, and many others. But he also "set to pictures" more mature—and equally fantasy-rich—literature: Shakespeare's "The Tempest" in 1908, "The Rubaiyat of Omar Khayyam" in



1909, and Poe's "The Bells" in 1912.

It was Dulac's good fortune to live in a golden age of fantasy, to be around when romance was king and the public willing to pay for painted kingdoms. The three-color printing process developed by Carl Hentschel of London facilitated accurate reproduction of color illustrations for the first time in history, and made illustrated books available at a reasonable price. And pictures were what people wanted: watercolor windows on realms of fantasy. The early 20th-century impulse was to gaze back longingly at medieval times, when the Arthurian legends were born in the West and the Arabian Nights rose in the East. Gift books found their subjects in the imaginary past, in tales by the Brothers Grimm and Hans Christian Andersen, in "Alice in Wonderland" and Shakespeare's more fanciful plays, in myths and Gothic mysteries and tales of adventure and heroism set on distant shores — the further from reality the better.

For about two decades, gift books fed society's romantic appetite and exalted the art of bookmaking. Coffee tables and bookcases creaked with lovely volumes, illustrators prospered, publishers grew fat. The London firm of Hodder and Stoughton commissioned Dulac to illustrate some 25 books between



1907 and 1918. Arthur Rackham, Dulac's chief rival, illustrated more than 50. But by the 1920's, the gift book declined, and a new generation of books and illustrators took over.

Today bibliophiles are taking a second look. Publishers have reissued early 20th-century gift book illustrations in paperback form. Original gift books have become collectors' items, meriting special places among libraries' rare volumes and commanding steep prices. A signed edition of "Stories from the Arabian Nights," for example, with Dulac's 50 color plates, now sells for nearly \$500, according to one reference. A signed edition of the "Princess Badoura" gift book, with only 10 Dulac plates, is listed at \$135, and a signed copy of "Stories from Hans Andersen" has sold for over \$400. Even early editions of Dulac's unsigned books are priced at close to \$100 — and this despite the fact that Dulac is still overshadowed by the more prolific Rackham.

Dulac could certainly have used today's vote of confidence — and

today's prices — when his career was faltering in the 1920's. After illustration assignments dried up, he turned to portraits, political cartoons, magazine covers and even the painstaking design of stamps and currency. Art Deco replaced Art Nouveau, and Dulac's work grew flatter, more stylized, full of fresh, unrestrained color. But no matter how he kept up with the times, his heyday had passed. Toward the end — he lived to be 71 — the Limited Editions Club of New York was his financial salvation. The club published beautiful books in the old gift-book tradition, and offered to pay Dulac handsomely for illustrating several volumes.

In 1953, Dulac was at work on the pictures for Milton's "Comus" when a friend stopped by. There was another, invisible visitor too, a gaunt gray fellow in shabby clothes whom Dulac had painted many times. Flamboyant as always, despite his age, Dulac cleared the floor to demonstrate his flair for flamenco dancing, stamped his feet with Spanish gusto, and collapsed. The gaunt visitor gathered him up: "Scheherezade invites you home," he said.

Rebecca Bruns, a free-lance writer and photographer, minored in art at the University of New Orleans and has shown her own paintings in 17 exhibits since 1971. She has also taught music and written for Dixie, a Sunday supplement in New Orleans.

Above: The fisherman's marble palace from the Arabian Nights tale "The Fisherman and the Genie." Opposite, pearly drops light the edges of Dulac's palace of the dragon king, from the Serbian fairy tale "Bashtchelik" (top); a near-Gothic illustration for Andersen's "The Wind's Tale" (bottom left); two illustrations for "Beauty and the Beast" show Dulac's use of Eastern details for European stories.





The Turn of a Century

WRITTEN BY PAUL LUNDE  
CHART BY PAUL LUNDE; GRAPHICS BY BRIAN SMITH

At sundown on November 19, 1979, a new century will begin – a new Muslim century.

For Muslims, who do not use the Gregorian, or Western calendar, that date will be the first day of the year 1400 "A.H." – the abbreviation for *Anno Hegirae*. The Latin term means "the year of the Hijra," and refers to the Prophet Muhammad's migration from Mecca to Medina, taken as the starting point of the Islamic calendar.

The Hijra occurred in the year 622 A.D. – as the Western world measures it – a year of great importance, for it marked the beginning of the first organized Muslim community, predecessor of today's world-wide community.

To most laymen today the organization of calendars is a total mystery. And even experts are hard pressed to give lucid explanations of why 1979, in China, is the year 4676, why "leap years" are vital, why February, in the Gregorian calendar, usually has only 28 days and why, to quote the schoolday mnemonic rhyme, "thirty days hath September, April, June and November."

Calendars always were confusing. The confusion, in fact, was one of the elements that persuaded 'Umar, the second caliph, to establish a purely Islamic calendar.

Until the time of 'Umar, exact calendars in the Arab World were of minimal importance to the Muslims. But as the Islamic empire grew, so did the problems of administration. 'Umar, for example, found himself faced with an extensive correspondence with his generals and regional governors, as well as with the daily tasks of regulating the financial affairs of the community. And one man, Abu Musa al-Ashari, later the governor of Kufa, finally wrote to 'Umar tactfully pointing out a problem. "You are sending us undated letters," he said.

Pondering this, 'Umar saw how undated correspondence might lead to confusion, and consulted with his advisors. What he found was that the various systems of dating then used in the empire were bewildering in their variety.

The Christian and Jewish communities, for example, used calendars calculated from the date of the creation of the world, a date about which there was, understandably, a good deal of doubt. The Coptic community in Egypt used a calendar based on the date of the accession to the throne of the Emperor Diocletian; other communities used the "Era of Alexander", and there were two calendars in use in Iran: one

based on the date of the accession to the throne of Yazdegird III, the other based on the date of his death. Because of this confusion – and the fact that the various calendars in use were intimately linked to other religions or to rival states – 'Umar decided to establish an Islamic dating system.

The first step, of course, was to choose a starting date, and immediately there were suggestions that the year of the Prophet's birth be the first year of the proposed new era. As this was not known with certainty, however, it was suggested – and agreed – that the Muslims adopt the year of the Hijra as the base year, because of the journey's importance to Islam.

But the Muslims did not take the exact day of Muhammad's arrival in Medina as the first day of the new year. Instead they took the first day of the first month – *Muharram* – of the year in which this crucial event took place. Thus the Muslim calendar started on 1 Muharram, 1 A.H. – which corresponds with 16 July, 622 A.D. (Some reference books give 15 July instead of 16 July; this discrepancy arises from the fact that Muslims reckoned their days from sunset to sunset, while the West reckons them from midnight to midnight.)

Because the Koran (Sura 10:5) establishes the use of lunar months for Muslims – that is, a calendar based on the phases of the moon – the Islamic year does not correspond with the Gregorian calendar,

which is based on a solar year; as an astronomical lunar month contains 29 days, 12 hours, 44 minutes and 3 seconds, a year composed of 12 such lunar months contains 354 days, 8 hours, 48 minutes and 36 seconds – which is approximately 11 days shorter than the solar year.

The months of the Muslim year, by convention, have 29 and 30 days alternately. This means that the *Hijra* – or, more exactly, the *Hijri* – year contains exactly 354 days. The 8 hours, 48 minutes and 36 seconds difference (11/30 of a day)

I		II	
AH	AD	AD	AH
1	622	622	1
100	718	718	100
200	815	815	200
300	912	912	300
400	1009	1009	400
500	1106	1106	500
600	1203	1203	600
700	1300	1300	700
800	1397	1397	800
900	1494	1494	900
1000	1591	1591	1000
1100	1688	1688	1100
1200	1785	1785	1200
1300	1882	1882	1300
1400	1979	1979	1400

Above: Column I gives the Hijri centuries and their Gregorian equivalents. Column II gives the Gregorian centuries and their Hijri equivalents. Below: This chart indicates the retrograde motion of the Hijri year with regard to the Gregorian year. The green lines are Hijri years, and they begin at left, and begin again at bottom right.

between this figure and the astronomical lunar year adds up to 11 days in every cycle of 30 years. These 11 days are inserted into the calendar by establishing leap years. Every period of 30 years, therefore, has 11 leap years of 355 days instead of 354. These are normally the 2nd, 5th, 7th, 10th, 13th, 16th, 18th, 21st, 24th, 26th, and 29th years of the 30-year cycle. The "leap day" which is added to these years is always assigned to the end of the month of Dhu al-Hijja, the month of the Hajj – the Muslim pilgrimage to Mecca – and last month of the year. In just the same way, the Gregorian calendar adds an extra day to February every four years.

Since the *Hijri* year is 11 days shorter than the Gregorian year, the beginning of each *Hijri* year falls 11 days earlier in the Gregorian calendar each year. Thus the *Hijri* year moves *backward* in relation to the Western calendar. This retrograde motion has an important consequence: Muslim festivals fall at different times each year, according to the Western calendar, although always, of course, in the same month of the *Hijri* year. Every 33 years, the months of the Muslim calendar make a complete backwards circuit of the seasons. This explains why the Hajj, for example, sometimes falls in midwinter and sometimes in summer. The months of the *Hijri* year, unlike the Gregorian year, bear no relation to the seasons.

The conversion of Gregorian to *Hijri*

dates and vice-versa is no easy matter, particularly if one is trying to find the exact day. The matter is further complicated by the fact that the Gregorian calendar used now did not come into use until 1582 in Europe, and not until the early 18th century in England. Dates before then, therefore, must be calculated according to still another system: the Julian calendar. Given this final complication, the easiest way to find the correspondence between a Gregorian and a *Hijri* date is to refer to a table.

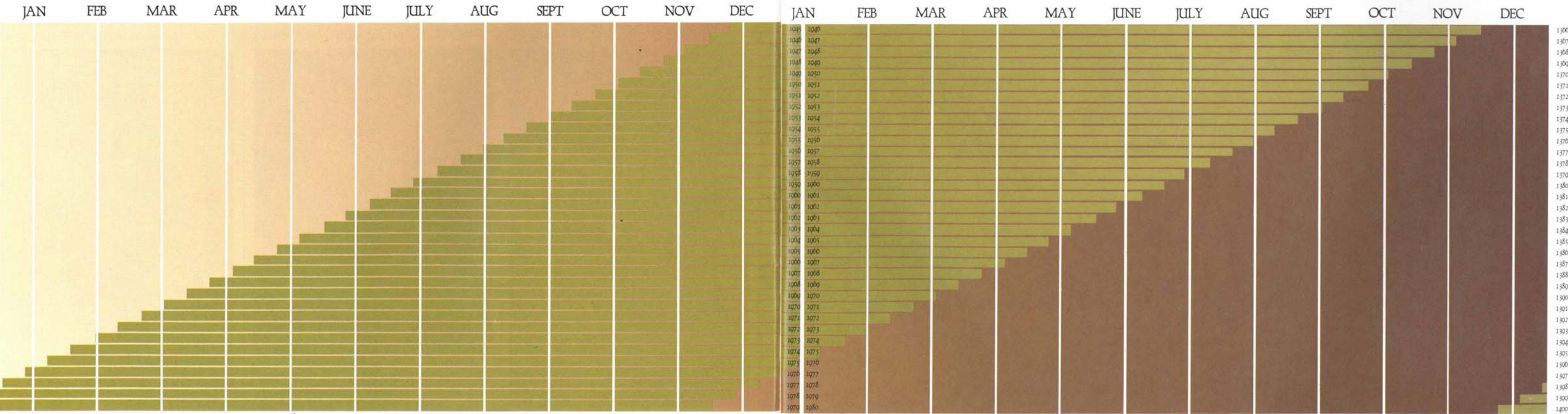
Converting years is much easier. A simple rule of thumb is that each Gregorian century equals approximately 103 *Hijri* years, and that, conversely, each 100 years of the *Hijri* calendar equals 97 years of the Gregorian. A useful benchmark is that the year 1300 A.D. corresponded with 700 A.H.

A more exact calculation can be made by using the following formulae, where G = Gregorian year and H = *Hijri* year:

$$G = H + 622 - \frac{H}{33}$$
$$H = G - 622 + \frac{G - 622}{32}$$

Applying the second formula, therefore, and consulting the tables, November 19, 1979 is 1 Muharram, 1400, the first day of the first month of the first year of the 15th century – A.H.

Paul Lunde is a staff writer for Aramco World Magazine.







"We will not wait...to achieve progress...  
we will start where human knowledge has ended."

# KFSH

## SHOWCASE OF THE FUTURE

WRITTEN BY MARY-JO McCONAHAY  
PHOTOGRAPHED BY TERRY WEBB, DAVID THOMPSON AND DICK MASSEY

**B**y a serene brown escarpment in Saudi Arabia last year, a helicopter clattered to a landing at King Faisal Specialist Hospital, a complex of green gardens and sculptured buildings near Riyadh. For a moment, as the pilot cut the engines, and the rotors of the airborne ambulance whistled and slowed, there was silence. Then the hospital's trained staff went into action: doctors, nurses, attendants and — a KFSH feature — computer programmers. Within minutes the new patient had been eased onto a stretcher and started on his way to a cool, clean room while, simultaneously, the staff began the elaborate tests, procedures, medication and treatment that eventually healed the patient and sent him home, his health restored.

The King Faisal Specialist Hospital, which opened in 1975, is among the most modern hospitals in the world. It is a showcase of modern medicine, a model for future health care in Saudi Arabia and a fitting monument to King Faisal, the man who outlined its basic concept in this quotation:

"We will not wait all these innumerable generations, as mankind has had to do, to achieve progress. Very often we will start where human knowledge has ended."

Against a backdrop of desert browns and yellows, the KFSH complex provides a memorable contrast with its buildings of warm native stone and tinted glass and its spectacular grounds,



DICK MASSEY

a great green oasis of imported trees and shrubs: Italian cypress, yellow oleander, Indian orchid and Chinese silk trees, roses, rosemary and thyme, California poppies and delicate baby's breath. For patient and visitor, it is a visual delight and a place where nature reigns.

Inside, however, KFSH is a place where technology reigns — medical technology of the highest order. One example is the \$60 million Cancer Research Institute which is scheduled to open next year and which will have its own \$4.3 million cyclotron (see box). And there are many more examples. Indeed, the entire \$250 million hospital is a computerized marvel.

In the "PBX room" near the lobby, for instance, a pink-coated bilingual technician monitors dozens of tiny television screens, their cameras trained on patients in their rooms. If a patient needs a doctor — or just another box of Kleenex — he simply speaks into the communication set at his bedside and the request is

transferred by the central console operator to nursing stations or utility points, a process that reduces the need for a large nursing staff. These cameras even "see" in the dark, so sleepers aren't disturbed by routine checks, and in case of emergencies, the technician can turn on a videotape and record the patient's activity during the few moments before help arrives.

The emphasis on technology is not, spokesmen say, an obsession with gadgetry. It is simply a rational response to a fact of life in Saudi Arabia: a decided lack of trained personnel. Despite a massive effort to provide thousands of students with university degrees in all fields of study (See *Aramco World*, May-June 1979), the kingdom's pool of professionals and technologists is still relatively small. As in early America, therefore, where constant shortages of manpower stimulated mechanization, Saudi Arabia is using technology as an efficient substitute until skilled manpower is more widely available.

At KFSH, for example, vital patient records — which elsewhere may divert precious nursing time from patient-care to record-keeping and require squads of file clerks — are now fed directly into a central computer virtually from the bedside.

The computer is just as important in the laboratory, where silent systems, their lights blinking busily, replace medical technicians, who are as scarce as nurses. In the clinical laboratory,



for example, automated equipment analyzes body fluids for diagnosis and treatment and transmits the results to a computer which gathers and sorts the information, prints its own special reports and sends the data to the central computer to update patients' files. Another system – the compact Sequential Multiple Analyzer with Computer (SMAC) – can run 20 different tests on 150 samples of blood in one hour with only one operator. As Dr. Nizar Feteih, chief of the cardiology division, says, KFSH laboratories are equipped with "the Rolls-Royce of equipment – the most sophisticated of its kind in the world."

This is particularly true in the heart catheterization lab. According to Dr. Feteih – a Saudi Arab who has spent 17 years studying and practicing in the U.S. – the programs and equipment there measure up to the best in the States.

Equipment, of course, is only part of the KFSH story. In the end it is people, not machinery, that make a hospital work. And in the intensive care unit, a highly mechanized area, Dr. Feteih himself gave an example during recent rounds. Although he carefully checked the computer screen by the bed of a sleeping patient, he also had a word with the nurse. Next he tousled a child's hair – raising a wan smile – and conferred with a young physician from Georgia on temporary assignment at KFSH. His bedside manner comes from the heart – and from the efficient support and spare time granted by the computerized systems.

Like Dr. Feteih, Mrs. Afaf al-Blaihed, a KFSH administrator, is also strong on the personal touch. The director of a staff of 110 in the outpatient clinic, Mrs. al-Blaihed finds that some patients temporarily forget their own concerns in their curiosity about her job: she is the first Saudi woman to receive a master's degree in hospital administration. (See *Aramco World*, May-June 1979.)

"Sometimes the women don't believe I'm Saudi," she grins. "Then I start speaking in slang and they know for sure. They are happy to meet someone who shares their way of life."

This is particularly true of patients from outlying regions of the kingdom, some of whom have never seen a modern urban hospital. During Dr.

Feteih's rounds, for example, his patients included a Bedouin shepherd from the Empty Quarter, a 50-year-old truck driver from Hail and an 18-month-old boy from the south. For them, the extraordinary technology of KFSH – along with the thick carpeting, plush sofas and twinkling chandeliers in the waiting room – may be an unsettling experience. Designers, with just that in mind, made a special effort to "plan away trepidation" by substituting walls painted a soft yellow, or covered in fabric, for the more traditional stark white, and by substituting discreet individual beepers for a p.a. system.

Unlike other hospitals in Saudi Arabia, KFSH does not admit all patients. As its name suggests, it is a referral hospital – a hospital that only accepts those patients who cannot be treated anywhere else in the kingdom. To be admitted, patients must be referred by provincial medical committees



to which their own physicians have first referred them.

If their physicians and the medical committees agree, however, patients will find an assortment of international specialists on tap to diagnose and treat them: dental surgeons, plastic surgeons and neurosurgeons; endocrinologists and otolaryngologists, experts in blood and tumors, and psychiatrists. Altogether there are more than 30 specialists on call at KFSH, enough to cope with the rarest or the most difficult condition.

And they do cope. In the four years since KFSH opened its sliding glass doors its experts have treated up to 10,000 out-patients per month and admitted 600 to 700 patients a month – many of whom might not have survived without referral to KFSH.

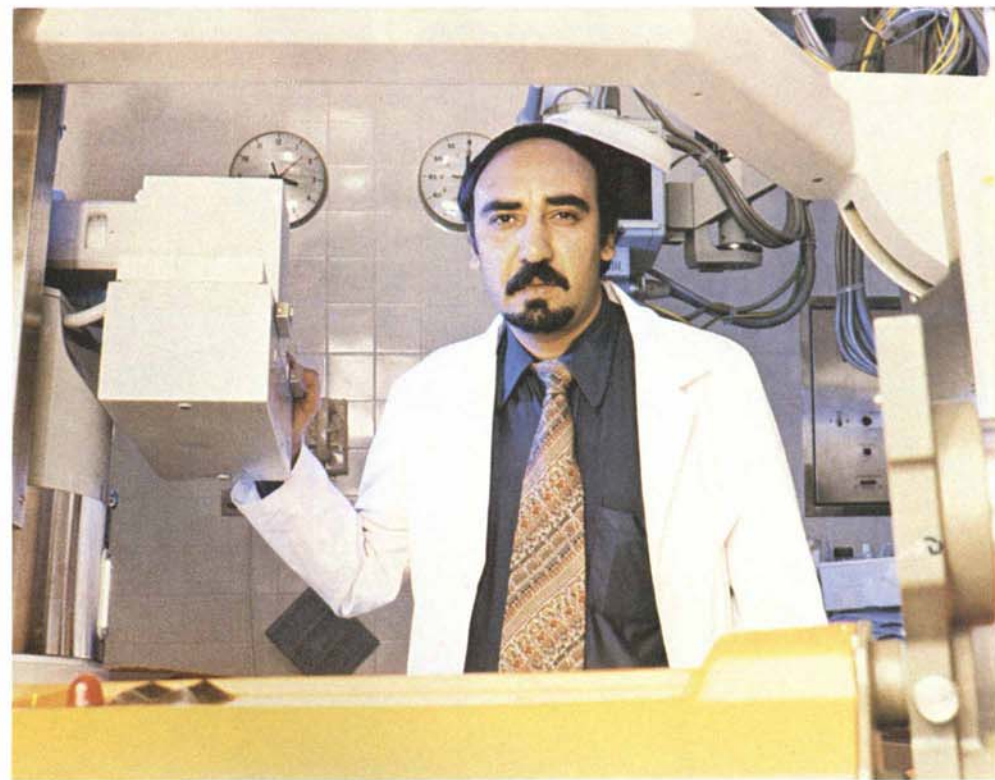
A case in point is Muhammad Z., a frail and wide-eyed little boy from Taif, whose parents brought him to the capital last year. Although he was eight years old, Muhammad looked more like five and, his mother said, turned blue whenever he ran or exerted himself – a symptom, perhaps, of congenital heart disease. Fortunately, the famed American cardiovascular surgeon Dr. Michael DeBakey (See *Aramco World*, March-April 1975) and a team from Baylor College Medical Hospital in Houston were just then inaugurating the hospital's own permanent open-heart surgery program. Muhammad Z. was to benefit.

The operation on Muhammad Z. – the first of its kind at KFSH – showed the hospital's facilities at their best. It was, simultaneously, televised to personnel in the hospital's medical library, still-photographed on the spot by hospital audiovisual staff – to be filed in the archives for future training – and videotaped for showing on public television.

It was also fine theater that, at KFSH and in Riyadh, got high ratings. In one scene, as DeBakey worked in the boy's open chest under the operating theater's bright lights, the cameras zoomed in to fill the television screen with the boy's pulsing heart and the master surgeon's deft fingers. In another, someone drawled, "O.K. now, turn on the bubble machine," and the bypass pump took over the boy's vital functions, as DeBakey went in for the delicate surgery on the suddenly motionless heart.

The operation got a high rating from Muhammad Z., too. Less than 90 minutes after he went under the first anesthesia, doctors could say of him, "He can look forward to leading a normal life now."

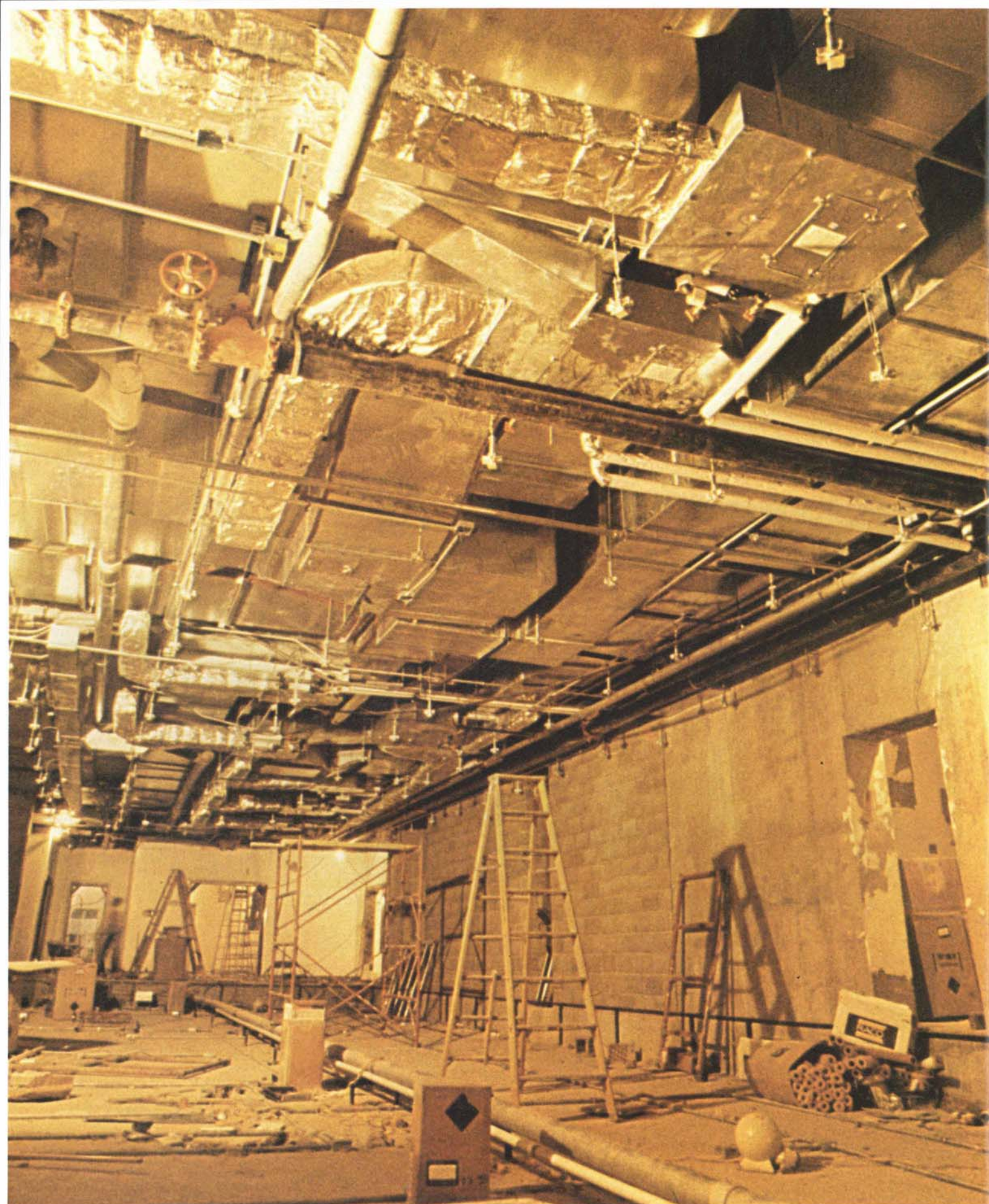
For KFSH, however, Muhammad's operation was just a beginning. Because there is a relatively high incidence of rheumatic fever – which damages the valves of the heart – in the kingdom, the addition of open-heart surgery to the list of KFSH specialized treatments has been invaluable to patients and has also expanded the capabilities of the cardiovascular department as a whole. Today about seven open-heart operations a week are being performed by KFSH's permanent team from Baylor and there



Opposite: A KFSH staff member in the cardiac care unit uses calipers to measure elements of a patient's heartbeat from an electrocardiograph record. Right: Cardiology division head Dr. Nizar Feteih in the hospital's heart catheterization laboratory, surrounded by "the Rolls-Royce of equipment." Below: Open-heart surgery underway at KFSH.







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# KFSH

## A CYCLOTRON IN RIYADH

**B**ecause King Khalid has declared that any person with cancer can be admitted, KFSH next year will open a \$60 million cancer research center — with its own cyclotron, or atom-smasher, one of medicine's more effective anti-cancer weapons.

In simple terms, a cyclotron breaks atoms down into even smaller particles — electrons, protons, etc. — and then propels them like bullets into other atoms, a process which changes the nature of the target atoms. Some iodine atoms, for example, become radioactive and these atoms, now called isotopes, are extremely useful in detecting, locating and treating cancer. Taken into the body of a patient — perhaps in a glass of water or even inhaled — the isotopes can be traced with a special camera to detect the tiniest, most hidden tumors; they cause the image of the diseased area to turn brighter than that of the surrounding normal cells. They can also be used to treat the cancerous cells once they have been confirmed and located.

For any cancer treatment center the advantage of having its own cyclotron is rooted in the "half-life" of the radioactive isotopes — i.e. the span of time over which the isotope is still effective. If the "half-life" is too short, the isotopes will be ineffective, but if it is too long the radioactivity may itself be dangerous when ingested. By having its own cyclotron, therefore, KFSH can produce isotopes suited to the needs of particular cases.

Some radioactive isotopes of iodine, for example, have a life span long enough so that KFSH will be able to manufacture them and ship them to the growing number of hospitals in the kingdom with facilities to use them. But KFSH can also

manufacture isotopes for use at KFSH, with a life span long enough for diagnosis, but short enough to reduce the danger of giving the patient too high a dose of radiation while trying to diagnose the complaint. If, for example, a patient comes to KFSH and doctors suspect thyroid cancer, they might, without a cyclotron, use the iodine isotope "I-131" for diagnosis; because "I-131" has a long half-life it is stored and available at many hospitals. But as "I-131" and other long-lived isotopes can give a relatively high dose of potentially dangerous radiation to the patient, doctors prefer to use isotopes with a shorter life span. While using "I-131" is an acceptable risk in

therapy if existence of a cancer has been proven, isotopes with equal effectiveness, but less hazard are obviously preferable.

"Here's where the cyclotron shines," says Raymond Barrall, director of the Cancer Research Institute. With a cyclotron, for example, scientists can make "I-123," an isotope which does the job but subjects the patient to 30 times less radiation than the long-lasting type; it has a half-life of only 13 hours. And that is not the minimum; still another important radioactive isotope made with the cyclotron — carbon-11 — has a half-life of only 20.4 minutes.

Besides radioactive isotopes, the cyclotron also can produce a neutron beam which can be used like a knife in pinpointing and destroying malignant cancers. As with all treatments of cancer, it is by no means a certain cure, but one hospital, the prestigious Hammersmith in London, has published clinical evidence that cancer patients treated with the neutron beam have a dramatically higher recovery rate than those who receive the more common cobalt treatment.

A cyclotron, obviously, is a costly facility for any hospital — the one at KFSH will cost about \$4.3 million — but as safety is vital, the hospital has invested heavily in two-meter-thick shields and walls, and in complex devices to monitor the air and the tanks where the wastes are held. In addition, the institute recruited 120 high-caliber specialists and Barrall — at the recommendation of the U.S. Atomic Energy Commission — to be head of the project. As in all departments, the institute knows that it is the combination of top people and high technology that will provide the quality of care KFSH hopes to give



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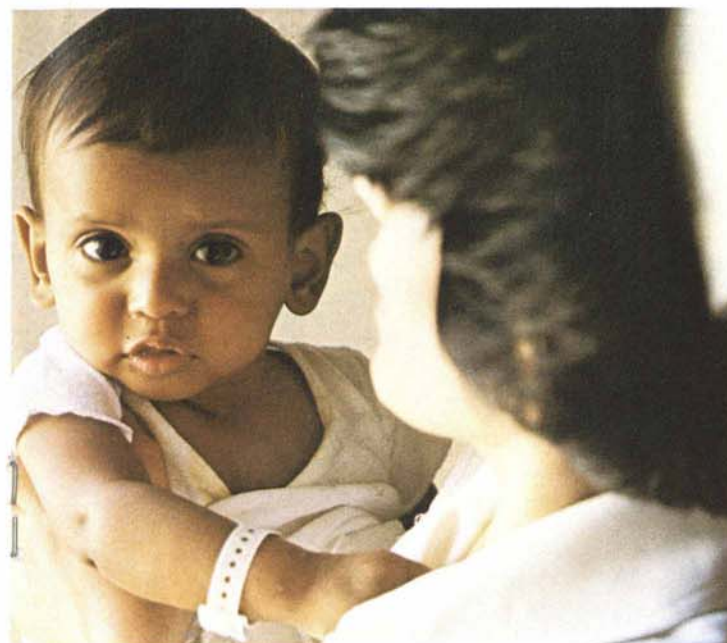
Opposite: Construction disorder will give way to cleanliness and precision when the new KFSH Cancer Research Institute opens its doors in 1980. Its cyclotron will be able to produce a range of radioactive isotopes for cancer diagnosis and treatment.



Right: Part of the control room of the hospital's two-channel closed-circuit television broadcast system serving patients and staff. Opposite: Children get the special care and attention they need at KFSH: a nurse cuddles an apprehensive small patient (top left); a technician examines a baby in the neo-natal intensive-care unit (top right); and a nurse plays with a convalescent child in a carpeted hospital courtyard.



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are plans to integrate Saudi surgeons into the team soon. As DeBakey said, after launching the program, "All the facilities are here for any kind of cardiovascular surgery we want to perform."

Such extraordinary facilities, it is true, have led to criticism from some observers who feel that the glamor of KFSH's high technology diverts attention from such basic medical needs as health education.

"Sometimes," says one KFSH administrator, "we get people who look around at the comfortable surroundings and high-powered machines, and say we are starting at the wrong end of the woodpile."

In fact, say hospital personnel, these high-technology processes and computerization are already effective tools for health education. Ushered into ultra-clean rooms, shown the modern facilities and given simple, straightforward and complete information about their illnesses and treatment, the patients themselves begin, back home, to spread the word about the quality of medical care they can expect in the future.

KFSH, however, does not leave it at that. Every month its personnel mail 2,000 detailed medical reports to the community doctors who originally referred the individual patients to the hospital. "Whether he ever sees the returning patient again or not," says Peggy Meeker, head of the medical

records department, "the local doctor reading the report is himself exposed to the latest medical regimen."

Upstairs, above the quiet bustle of the hospital streets, the KFSH public relations department also does its bit for health education. Its staff prepares programs for a local "Radio Doctor" show and produces a weekly full-page feature for a Riyadh newspaper written, in Arabic, with the assistance of staff doctors.

These articles, which are illustrated, cover a wide variety of subjects: advice on diet and nutrition, explanations of psychological problems, warnings on the hazards of smoking or suggestions on treatment of snake bites or scorpion stings.

In other articles staff writers have focused on modern medical technique, highlighting X-rays in one and, in a feature on amniocentesis, showing the womb being punctured and explaining how doctors use the extracted fluid to diagnose the condition of an unborn baby. The PR writers also produce little books with layman's texts and lively but precise colored drawings to instruct patients in caring for themselves after they leave the hospital.

Television is equally valuable in health education, said Dr. Alvin Merendino, director of medical affairs. Dr. Merendino, in fact, would "love to have a public educational television station" to reach those who do not or cannot read, and thinks that the hospital's

closed-circuit television system could provide enough medical material to justify it.

Located on the hospital's second floor, channel KFSH, operated by the audiovisual department, already transmits on two closed-circuit channels to every hospital room and to the hospital community, often running its own shows about medical topics and even printing a weekly TV guide. In a sense, it's entertainment, but it is also a substitute for the years of quasi-educational programs such as Dr. Kildare, Ben Casey and Marcus Welby, which, says Bill Jarr, acting head of the audiovisual department, may not have been good medicine, but did give people a familiarity with hospitals and medical practice. "Here," he says, "we have to do part of that job too."

Jarr's staff, for example, noticed that the Arabic terms for peptic ulcer (*qarha*) and a simple gas pain (*harqa*) were similar and wondered if some people might, therefore, worry unnecessarily. So the audiovisual department created a ten-minute film explaining the difference, and showed it recently between a rerun of "How to Lose a Million" and a show on traditional Kuwaiti dancing. During the same week, patients viewed television films made in the hospital on asthma, vaccination and infections.

Such films, Jarr says, are made "with patients' fears in mind," but more direct material is also broadcast on a special channel to 11 locations exclusively for



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medical staff. "The Surgical Removal of Liver Cysts" may not appeal to the average viewer, but it is shown on the "professional" channel as part of the hospital staff's continual process of teaching each other.

This, at KFSH, is important and the hospital's provisions for it are, like its technology, elaborate. Its quiet wood-and-gold-leaf medical library is stocked with 5,000 books, 300 medical journals, plus cassettes and microfilms.

Another example of cross-staff teaching is in the medical records department where about half the 43 employees are receiving training as they work—part of a special effort to teach the vital arts of medical transcription and record-keeping to local personnel and thus, eventually, upgrade record systems in hospitals across the kingdom.

Even for veterans, however, KFSH is a continuous learning experience. When DeBakey's open-heart team came, for example, records department employees were called to a meeting at which a surgeon demonstrated the micro-valve replacement and then translated the operation into layman's terms. "When something like this happens," says Meeker, "it's like learning a whole new language for everybody."

KFSH is also involved in other aspects of medicine, seeking to draw national medical profiles for the first time and to discover the special health needs of the Saudi population. What, for instance, are the "normal" levels of

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# KFSH

## MODEL FOR MANY

**K**FSH is unique, but it is not an island. Its high-technology medicine is a preview of the modernization and extension of medical care that the Saudi government is pushing in most areas of the kingdom. To modernize and improve the kingdom's entire system of medical care is, of course, an enormous undertaking that will require time and money. But the undertaking is well under way. Saudi Arabia today has 67 hospitals and numerous clinics both public and private, all of which are being—or will be—upgraded and provided with new equipment. In addition, Saudi Arabia, under its current Five Year Development Plan, is hoping to provide 11,500 hospital beds by 1980.

One major effort, a five-hospital turnkey project by a single European firm, will provide a total of 2,113 beds at facilities in al-Khobar, Hofuf, Jiddah, Jizan and Medina; nearly completed, the hospitals are scheduled to open this summer. Another—launched last May when Saudi health minister Dr. Hussain al-Jazairi signed close to \$300 million worth of contracts—will provide hospitals in Hail, Najran and Tabuk, and a health institute in Dammam.

In addition, King Khalid recently opened a 330-bed, \$46.2 million armed forces medical facility to serve Riyadh and the military industries in al-Kharj. The first stage in the construction of a comprehensive center with medical installations worth some \$300 million, its equipment includes a network of computerized data banks and a system of constant contact with international medical centers.

There are, it is true, no other specialist hospitals in the kingdom like KFSH. But there are individual specialized centers, such as the new Maternity and Children's Hospital in Jiddah, a mental hospital in Taif, and a fever hospital in Abha. And most of the new hospitals being built include at least some of the medical

technology and computerization that is the hallmark of KFSH.

Last year, furthermore, the Ministry of Health—recognizing that personnel are as important as technology in medical care—opened a massive campaign to recruit some 5,000 physicians, nurses and medical technicians to man the five new hospitals in Jiddah, Medina, al-Khobar, Hofuf and Jizan. To launch the campaign the government sent a recruiting committee to South Korea, the Philippines and Bangladesh.

Such recruitment is essential, says Dr. al-Jazairi, because Saudi Arabia is "crucially short" of trained medical manpower. Only eight percent of the Ministry's doctors, for example, are Saudi Arabs. Thus health officials think that medical care will have to include foreign medical staff for some time to come.

On the other hand, the ratio of Saudi Arab physicians and nurses is expected to increase once the kingdom's new programs of medical training get into high gear. The University of Riyadh Medical School has already graduated its first class of physicians and other students are studying at medical schools at King Abdulaziz University in Jiddah, King Faisal University in Dammam, and abroad. In addition there are now four nursing schools in the kingdom.

Saudi women are especially enthusiastic about medical studies. Some 200 Saudi girls are enrolled in the medical school in Dammam alone, all of whom look forward to careers as sorely needed doctors for other women and for children. Nevertheless, with the competition for talent in the booming kingdom, medicine as a career still attracts fewer candidates than, for example, engineering.

Medical care in the kingdom is complicated by one situation unique to Saudi Arabia: the annual influx of 800,000 to a million or more pilgrims, most from abroad, who come by air, sea and road during the Hajj, the Muslim

pilgrimage to Mecca. Because these visitors may introduce communicable diseases to the kingdom, an immense preventive effort is required which, of course, temporarily diverts many of the kingdom's already strained resources.

Yet health care of pilgrims is also a demonstration of how well public health teams in the kingdom can function. The entire Ministry of Health, for example, moves for the time of the Hajj from Riyadh to Jiddah—the main port of entry—to mobilize the personnel necessary to enforce the kingdom's strict vaccination requirements and supervise sanitation programs for the huge crowds of pilgrims.

Public health programs, however, are not limited to pilgrims. According to Dr. al-Jazairi, the kingdom is also mounting a campaign to eradicate malaria and bilharzia and expects to have those diseases under control within four years. In an even more ambitious effort, health authorities say the kingdom hopes to have eliminated all communicable diseases by the end of the third Five Year Development Plan in 1985.

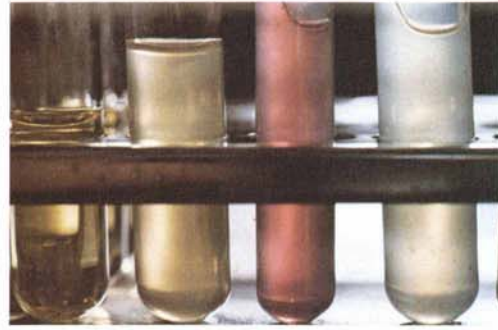
Meanwhile, other programs continue quietly and steadily. At Khamis Mushait's military hospital, a team of doctors from Loma Linda, California, periodically perform open-heart surgery on selected patients from across the kingdom. In the Eastern Province, Aramco, in cooperation with the Ministry of Health, continues its study of sickle-cell anemia. The study has already determined that the course of the hereditary disease, found locally in a few areas, is generally more benign than in the U.S. and elsewhere. If the project team can determine exactly why that is so, then here and throughout the world victims of the more severe type of sickle-cell disease can look forward to more effective treatment.

By such programs of research, buttressed by construction of new hospitals, modernization of older hospitals and continued development of the KFSH referral facilities, Saudi Arabia hopes to provide tomorrow's medicine today.

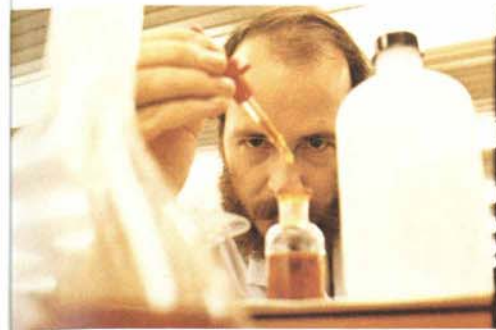




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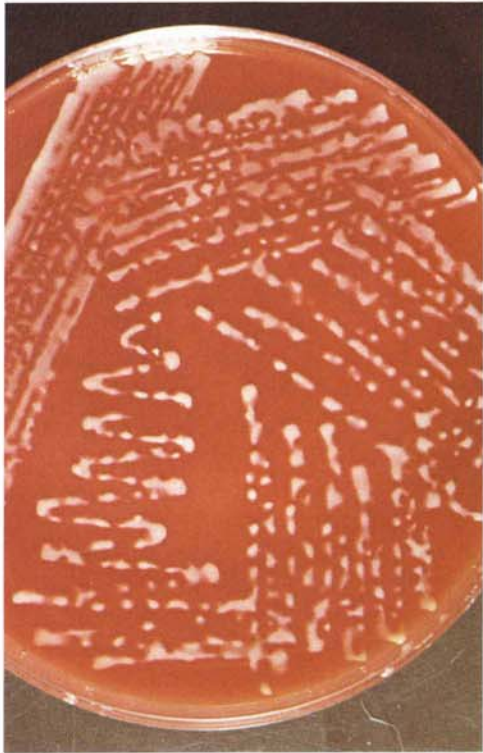


DAVID HILLS



DAVID THOMPSON

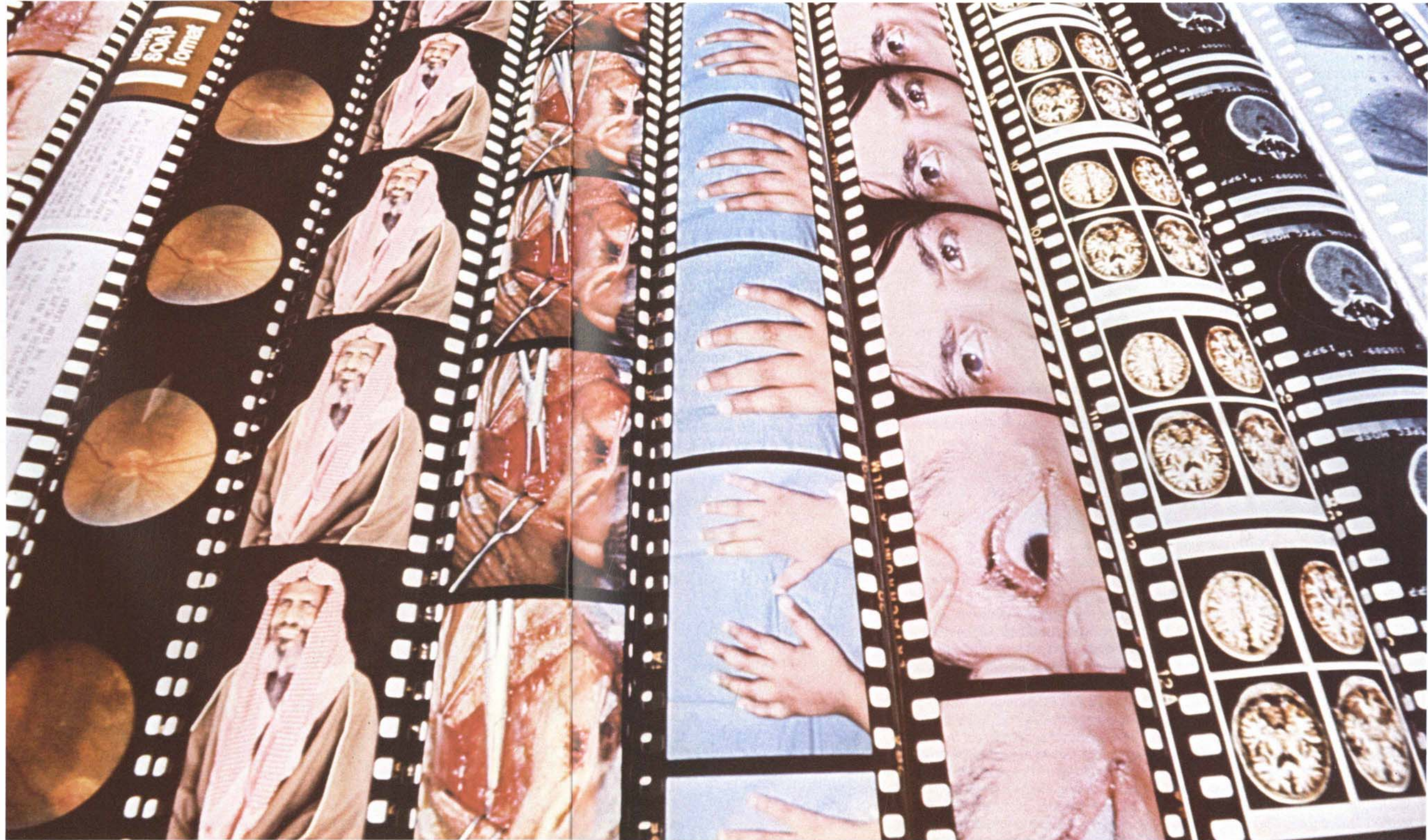
Though technicians at KFSH operate complex electronic equipment in the hospital's microbiology laboratory—at top left is an L.A.R.C. automatic blood-cell counter, for example—traditional equipment like test tubes and petri dishes still has an important role to play, and there are still times when the technician's unaided, steady hand and eye are essential. Below, biomedical photographs hang drying in the hospital's specialized photo lab.



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# KFSH

## A SWING OF THE PENDULUM

WRITTEN BY CAROLINE STONE ILLUSTRATED BY NEVILLE MARDELL

The opening of the ultramodern, high-technology KFSH created a considerable stir. In one dramatic move, Saudi Arabia had established in the Arab East a hospital to rival many of the great medical centers of the West.

In a sense, however, the establishment of KFSH was a case of history repeating itself. For the Arab East, centuries ago, had pioneered many of the advances in hospital care that subsequently evolved into the modern, scientific care represented by KFSH and hospitals like it around the world.

The precise beginnings of medicine are difficult to trace. Some evidence suggests that medicine as a science goes back to Babylon some 6,000 years ago—long before Greece emerged as a center of philosophy and science—and was flourishing in both India and Iran in very ancient times.

History is also vague on the origins of hospitals. The word "hospital" comes from the Latin *hospitium*, a place where hospites, or guests, were made welcome—and hence is linked to such words as "hostel," "hotel" and "hospice." But hospitals themselves probably go back to a time when the sick gathered at the temples of gods, hoping for relief, and by the fourth century were fairly common.

Christians in the Roman Empire, for example, had established hospitals for lepers, cripples and the blind, and religious communities existed which cared for the sick.

The fourth century also saw a great advance in medicine. Because of an upheaval at the University of Edessa—present-day Urfa in Turkey—scholars fled to Jundishapur in Iran, bringing with them many precious medical textbooks. As so often happened when East met West, the emigration of the scholars initiated a flowering of scholarship. By about A.D. 500 Jundishapur had established a medical academy and a hospital, and had

become a center for the translation of medical texts by Greek and Indian authors, first into Persian, later into Arabic. After the Muslim conquest, Jundishapur also provided doctors for many of the new Islamic cities, particularly Damascus and Baghdad—where, in the Golden Age of Islam, medical science moved dramatically forward.



One element in this surge was the establishment by the Caliph al-Ma'mun of the Bait al-Hikmah, the "House of Wisdom," in the year 830. Primarily a research institute, the Bait al-Hikmah rescued and preserved the treasures of Greek learning from oblivion and provided Arab scientists with the foundation for their own spectacular advances in medicine.

Arab scientists, for example, discovered the circulation of the blood in veins centuries before Harvey did, worked out the principles of infectious disease, discovered a vaccination against smallpox and could perform eye operations with a skill subsequently lost until our own century.

Hospitals in the Arab East were not, at first, popular. Because of strong family attachments Arabs preferred treatment at home—a preference that endures to this day. But with the gradual urbanization that followed the spread of Islam, hospitals became essential and by the 12th century had spread throughout the Islamic world.

The organization of these hospitals was very similar to that of today's hospitals. In 1183, for example, Ibn Jubair (See *Aramco World*, November-December 1978) visited the great hospital of Cairo built by Saladin, and described it in detail:

It is a palace, goodly for its beauty and spaciousness... In the rooms of this palace were placed beds, fully appointed, for lying patients. At the disposal of the intendent are servants whose duty it is, morning and evening, to examine the conditions of the sick, and to bring them the potions and food that benefit them.

Facing this establishment is another especially for women, and they also have persons to attend them... who examine their condition and give them what is fitting for them. All these matters the Sultan oversees, examining and questioning and demanding the greatest attention and care to them. In Misr (another part of Cairo) there is another hospital of precisely the same model.

Ibn Jubair also provided a description of "the well-known hospital of Baghdad" after a visit there in 1184:

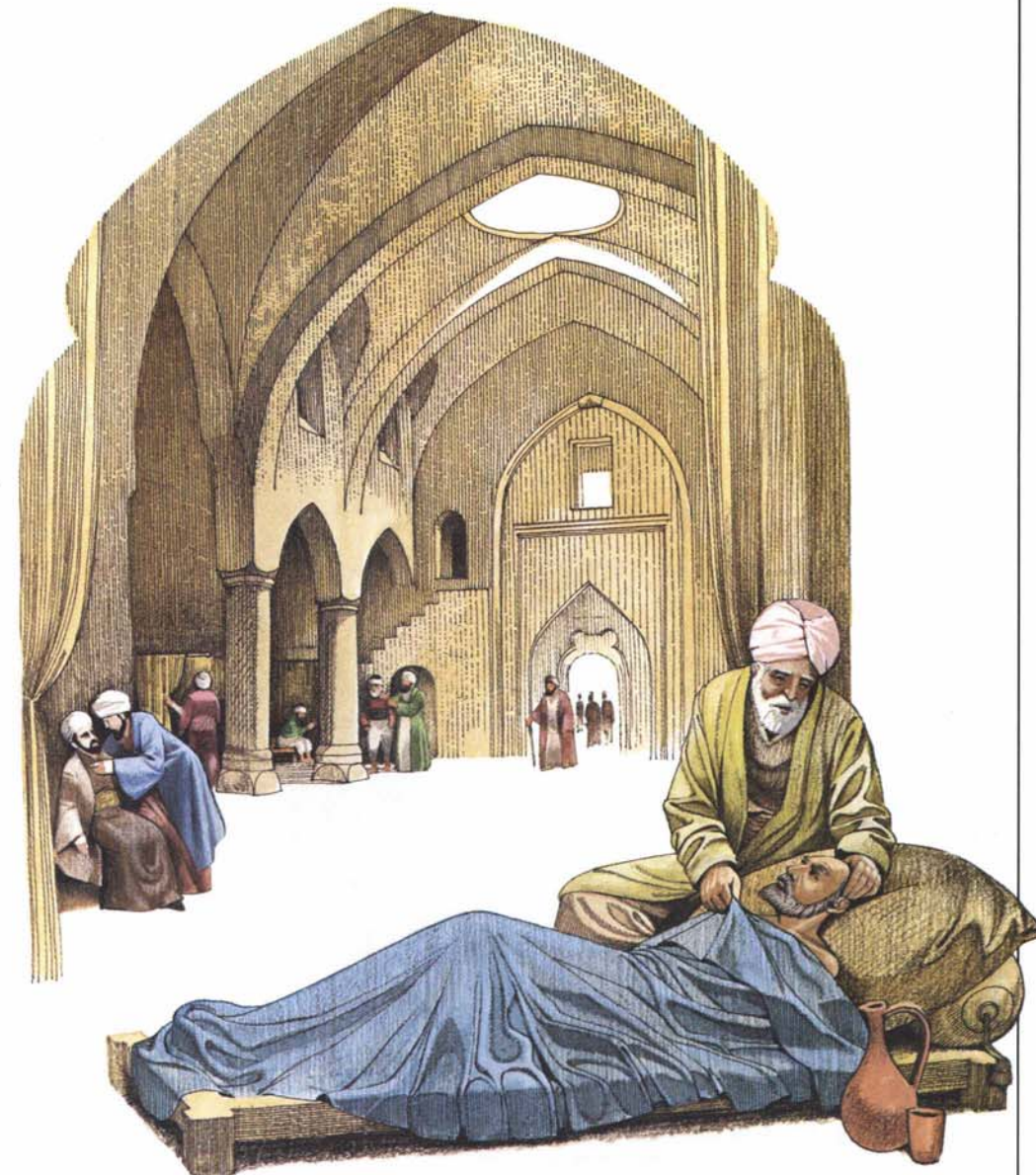
It is visited by physicians every Monday and Thursday, who examine the patients, prescribe for them the proper treatment and order them the food that they require. These physicians have under them nurses whose duty it is to prepare the medicines and food. This hospital was once a large palace and consists of a number of halls and rooms. It is provided with every comfort, such as is found in the royal establishments. The water supply is from the Tigris.

Great cities such as Cairo and Baghdad were not the only ones to provide medical

care for their inhabitants. Shiraz, Tabriz, Samarkand and Jurjan, for example, all had their hospitals, but so did such small townships as Biriz, outside Shiraz, and provincial centers as far away as Marrakesh in North Africa. The Marrakesh hospital, in fact, was described by one 13th-century visitor as "unequaled in the world." It was, the visitor continued,

embellished... with a beauty of sculpture and ornamentation... All sorts of suitable trees and fruit trees were planted there. Water there was in abundance, flowing through all the rooms. In addition there were four large pools in the center of the building, one of which was lined with white marble. The hospital was furnished with valuable carpets of wool, cotton, silk and leather, so wonderful that I cannot even describe them.

On the Arabian Peninsula, Mecca and Medina also built noteworthy hospitals and Taif—not surprisingly—was



recommended as a place for convalescence because of its healthy climate.

Arab travelers like Ibn Jubair were not the only visitors to be impressed by the Islamic hospital system. Rahere, court jester to King Henry I of England, founded the famous St. Bartholomew's, or "Bart's" Hospital, in London, apparently because he admired the hospitals he saw in Syria, Lebanon, Egypt and Palestine during the Crusades.

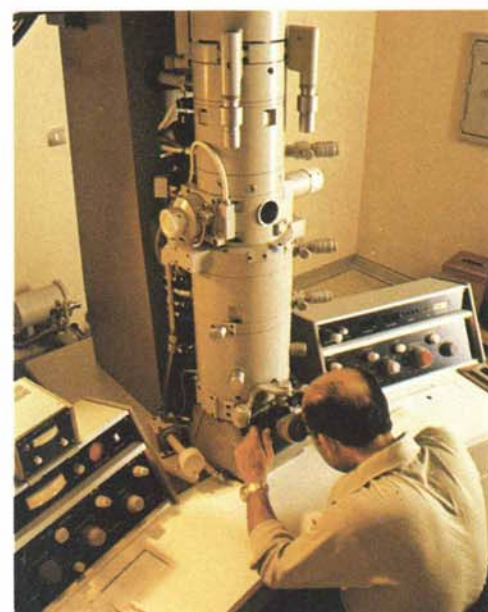
Nor was he the only Crusader to be impressed. The Knights Hospitalers—also known as the Knights of Rhodes and the Knights of Malta—based their hospitals on one founded by their chief foe,

Saladin. Such hospitals, established by the Knights, set new standards for medical care in the West. Airy, clean and stocked with medicines, they aroused admiration for centuries.

Such interaction between East and West runs through the entire history of medicine and hospitals. What one area developed the other learned, preserved and improved—and then returned. In the past few centuries the West has forged far ahead but possibly, the establishment of KFSH suggests, the pendulum may one day begin to swing again.

Caroline Stone writes regularly for *Aramco World*.





Above: An artificial heart valve, suspended in a web of sutures, is lowered into place. Top left: A technician adjusts a patient's position in an X-ray scanner, which uses a computer to build up a detailed picture of a cross-section of the body. Top right: Part of the KFSH central computer room. Right: A technician switches on an electrocardiograph recorder in the cardiac care unit monitoring room. Far right: A specialist works with an electron microscope.

hemoglobin and cholesterol among the Saudi population? Why does there appear to be more cancer of the throat and esophagus than of the lung? KFSH finds the answers by measuring, examining and treating Saudis within the kingdom and by assigning medical specialists and scientists who know what the correct queries are, and how to use the latest support equipment to tabulate and analyze results.

Another aspect is research in such fields as nutrition. Dr. Fredrik Serenius, for example, a pediatrician and head of the Neonatal Service, is working with the Saudi Arabian Food Establishment to improve the health of Saudi children by supplying them with nutritious school lunches. As part of this project he – with Dr. Dominique Fougere and nurse Farida Foula – trekked far afield to conduct surveys, to talk extensively to sometimes willing, sometimes shy families, and to examine children. The team traversed the stone desert north of Riyadh – where villages are sometimes an hour apart – to the Nafud and the region of al-Qasim. Enroute they slept in village schools and provided ad hoc health education in their mobile clinic.

As the survey results are still being analyzed, the researchers have yet to come up with specific results on nutrition. But they have already concluded that there is a great need for general preventive medicine.

As preventive medicine does not necessarily demand fully qualified doctors – who are still in short supply – Dr. Serenius suggested that selected villagers be given a six-month course in community hygiene and health care and basic first aid. He also noted that pregnant mothers needed more check-ups and KFSH has approved a study to identify local high-risk factors in pregnancy which might endanger a child's future health. The hospital, in cooperation with a government project, is also pushing polio inoculation as well as providing orthopedic rehabilitation.

Yet it is as a referral center that KFSH has won its reputation. And although some observers do question the need for the apparent luxury and what seems to be an excess of medical technology, even critics admit that KFSH is invaluable. One, a surgeon himself, said: "I wish every city could have the same services."

Some other areas, in fact, are begin-

ning to provide similar care (see box) but in the meantime KFSH, like a healthy plant, continues to grow. Although it is already a virtually self-sufficient city – with its own power station and a five-million-gallon underground reservoir – KFSH has continued to build new facilities. Under construction, for instance, are a corneal transplant unit and a new 150-bed minimal-care facility "like a hotel cum hospital," where out-of-town patients who need only basic treatment can stay close by and avoid traffic and hotel bills. Plans are in hand to add 250 beds, new housing for nurses and to expand the

outpatient clinics. KFSH is also developing facilities that may establish it as a central blood bank for the kingdom. Supplies of blood are frozen so they last for years instead of weeks – an important consideration in a region where the public is still not fully accustomed to the idea of "giving blood."

Blood freezing, brain scanners, SMAC, sensors and cyclotrons, heart-lung bypass machines – it's an impressive inventory. But what is more impressive is the care KFSH provides and the hope it offers to the patients. They may not understand high technology but they do understand that however rare, or advanced, or complicated their cases may be, KFSH is offering the best care possible. And in the end, that is probably all that matters.

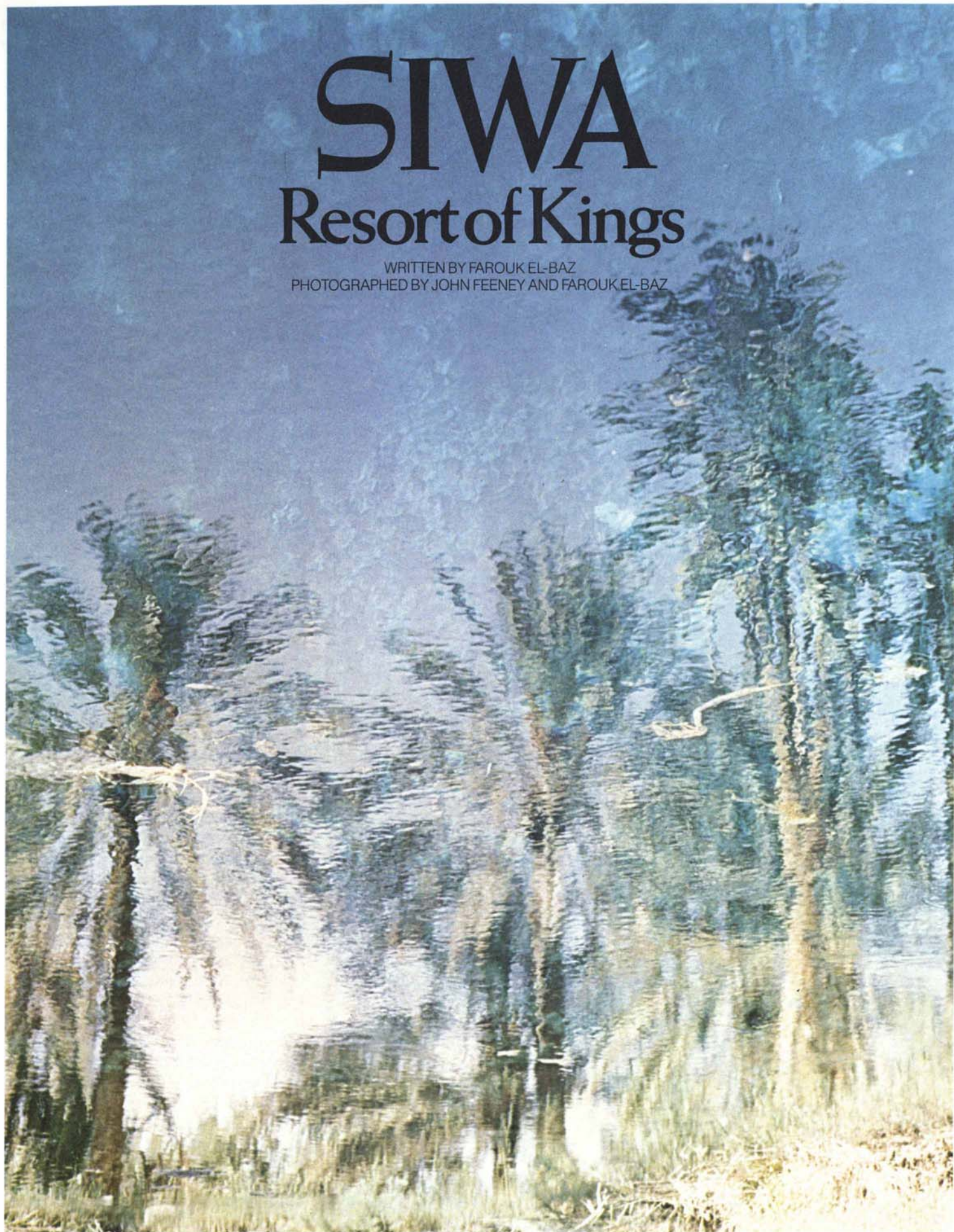
Mary-Jo McConahay, a reporter for The Arab News, an English-language daily in Jiddah, has done free-lance writing for Ms. and New Times from Mexico and has lived in Saudi Arabia since 1976.



# SIWA

## Resort of Kings

WRITTEN BY FAROUK EL-BAZ  
PHOTOGRAPHED BY JOHN FEENEY AND FAROUK EL-BAZ



For the first time that day, the road sloped abruptly downward. The palms and houses of the oasis we had come so far to see sprang into focus like a mirage that had suddenly come alive. Following the footsteps of kings and conquerors, we had reached the Siwa Oasis.

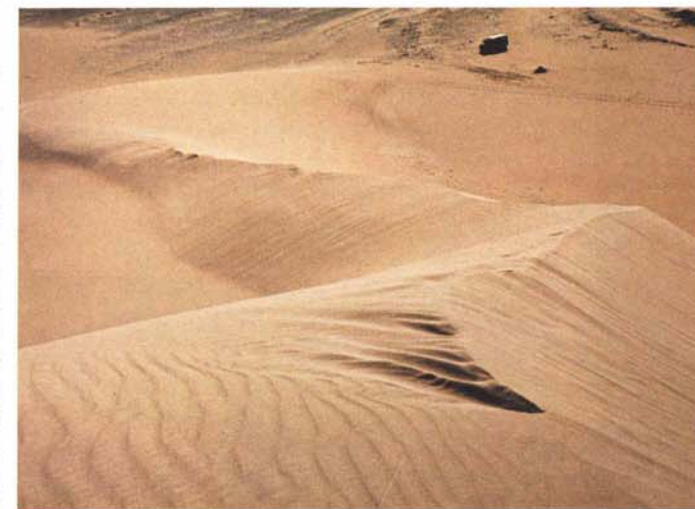
Of all the oases in Egypt's Western Desert, Siwa is the farthest from the Nile. It lies on the old caravan route from Cairo to Marzuq in Libya, where the desert roads fork north to Tripoli, south to Lake Chad, and west to Timbuktu. These routes in the Sahara have been used from time immemorial, leading across relentless desert from one well to the next—sometimes in stages of 200 miles or more. Such journeys by camel caravan must have truly tested the travelers' courage and perseverance, sometimes fatally: many who set out to cross the Sahara never returned.

We had every intention of returning, however, and our trip to Siwa took a longer but safer route. Starting from Giza, near Cairo, five geologists from 'Ain Shams University and I traveled easily north to Alexandria, then west along the Mediterranean coast to Mersa Matruh. From there southward to Siwa, the road was treacherous, but a line of telephone poles—the non-functional ghosts of a communications system—still marked the route and kept us from losing our way. Along that 200-mile extent of dry wilderness, that would have been a disaster.

We had spent all morning driving up the limestone plateau that lies between Siwa and the coast, and most of the afternoon crossing a bleak and barren desert pavement. Though one of our two cars burst into flames along the road and had to be towed by the other, our hardships on the route were

small compared with those that travelers before us must have suffered.

In the middle of the sixth century B.C., Cambyses, the son of Cyrus the Great of Persia, began the expansion of his father's conquests. With the support of a Samian and Phoenician navy, he conquered Egypt; from Siwa he penetrated into The Sudan and Ethiopia. Siwa was also the site of the Temple of the Sun God, Amon, and the nearby Oracle Temple. There Alexander the Great was honored by the priests of Amon as the son of the Sun God in 331 B.C.; Alexander wanted to become pharaoh and Egypt would not accept that unless he had been declared divine. Not far from the temple, a water pool glistens where, it is said, Cleopatra used to bathe.



In this century, King Fuad of Egypt made the trip to Siwa along the coastal road we took, the same one that had nearly exhausted Alexander's army some 23 centuries earlier. Before Fuad's party took to the road, however, several wells were dug along the way. King Farouk, the last of Egypt's monarchs, also made the trip to Siwa, although he chose the more southerly desert route of the camel caravans. Other Egyptian leaders have also gone there, one of whom left Siwans a deep water well and—an especially wel-

come gift—a plane. Flying its twice-weekly circuit between Mersa Matruh and Siwa, it is the only regular link between the oasis town and the rest of Egypt.

What brought us to Siwa was not the strategic advantages that attracted Cambyses, or Alexander's political and religious calculations, or even the rural green of the oasis itself. Siwa is, after all, only one of many oases in the Sahara's northeastern corner. Its irrigated area is only about 35 square miles—less than the size of many a Pacific Ocean atoll. But the waves that surround Siwa are not salt water; they are the sun-scorched sand of some of the largest dunes in the world, the northwestern edge of the Great Sand Sea.

No, what brought us to Siwa was a scientific study. Under my direction, the American astronauts of the Apollo-Soyuz joint space flight had made photographs and observations from orbit of this area—part of a larger NASA study of Middle Eastern deserts (See *Aramco World*, November-December 1976). Now we geologists had come to try to match up the "ground truth" with the space observations.

To study the general setting of the Siwa area before the trip, we had spliced together two Landsat satellite photographs that contained parts of it. The images confirmed the descriptions of earlier explorers and cartographers, showing that Siwa and the surrounding smaller settlements lie nearly in the center of a shallow depression about 30 miles long—the Siwa Depression. But they also showed that there is another smaller depression in the desert surface 10 miles to the east, and it was a surprise to learn, when we got there, that neither the mayor of Siwa nor the commander of the border patrol in the

**In the footsteps of kings and conquerors came the geologists, bearing photographs from outer space...**



area was aware that smaller depression existed. (The mayor was particularly happy to learn of it since it constituted an increase in his territorial jurisdiction.) More surprising was the fact that the smaller depression was totally uninhabited, even though the favorable conditions prevailing in the Siwa Depression were nearly duplicated there.

Dr. Hassan El-Etr, the structural geologist with our group, noted that both depressions are bounded by faults that intersect in an "X" pattern. His observation helps explain the origin of the depressions: fractures and faults weaken the solid rock along the ruptured zone, and the weakness makes the rock vulnerable to the erosive powers of rain and wind. These forces are helped by the enormous temperature difference between the intense heat of the day that expands rock, and the freezing cold of the night that contracts it – a difference that can reach 70 or 80 degrees in summer in the Siwa area. As erosion proceeds,



grains that were once part of the solid rock are loosened and, one by one, lifted by the winds to become part of a migrating dune.

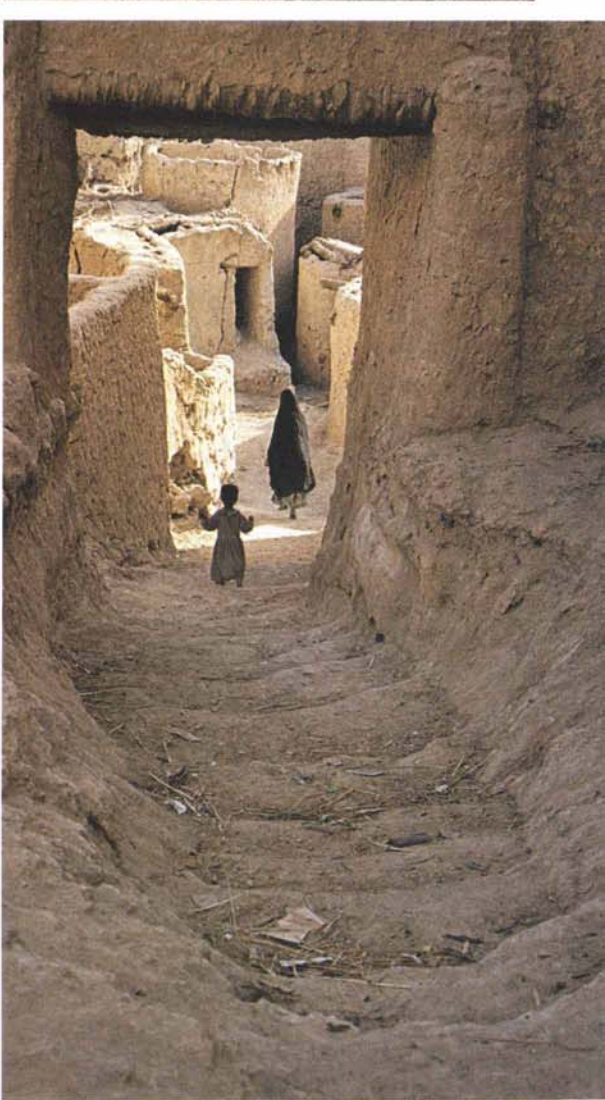
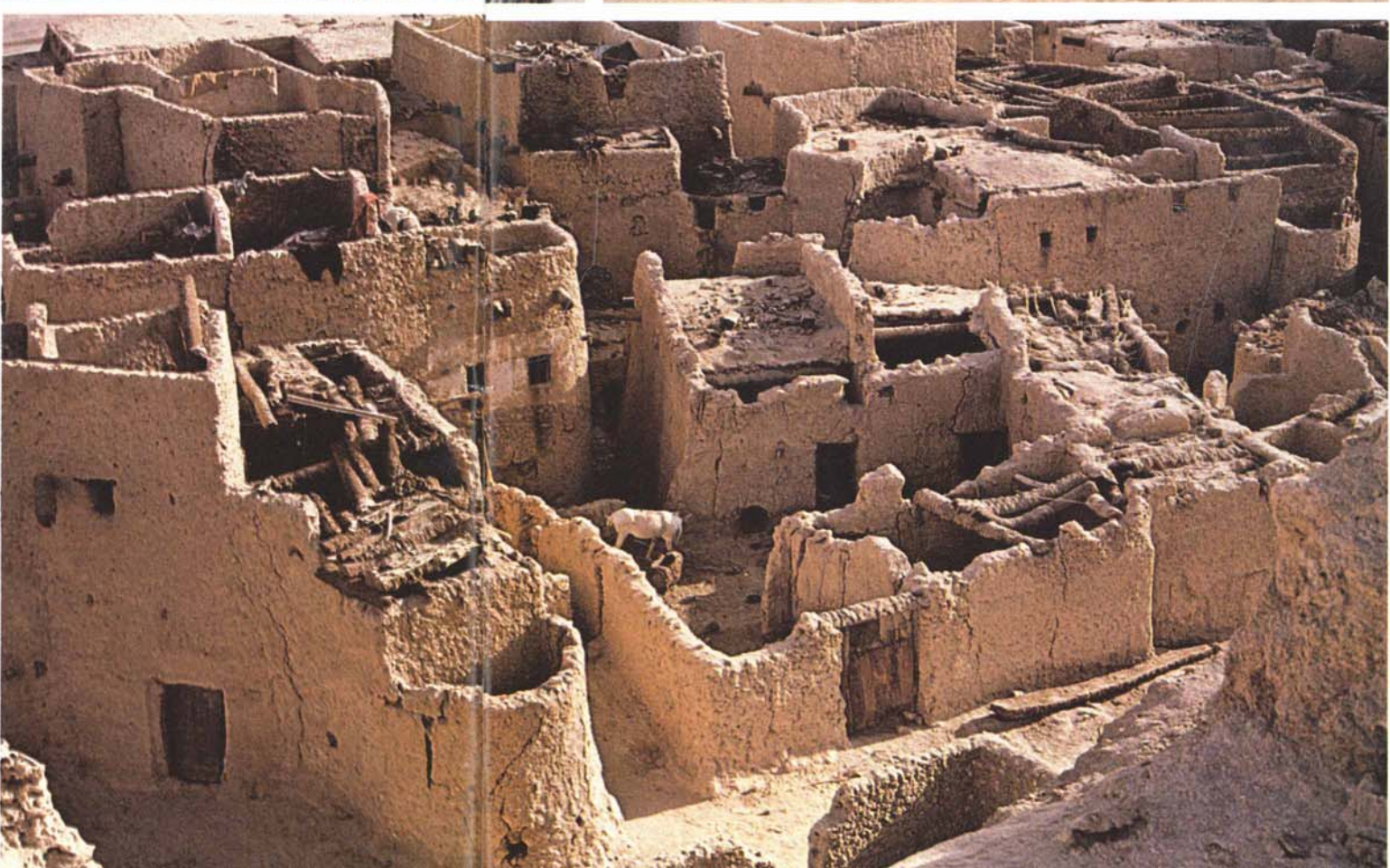
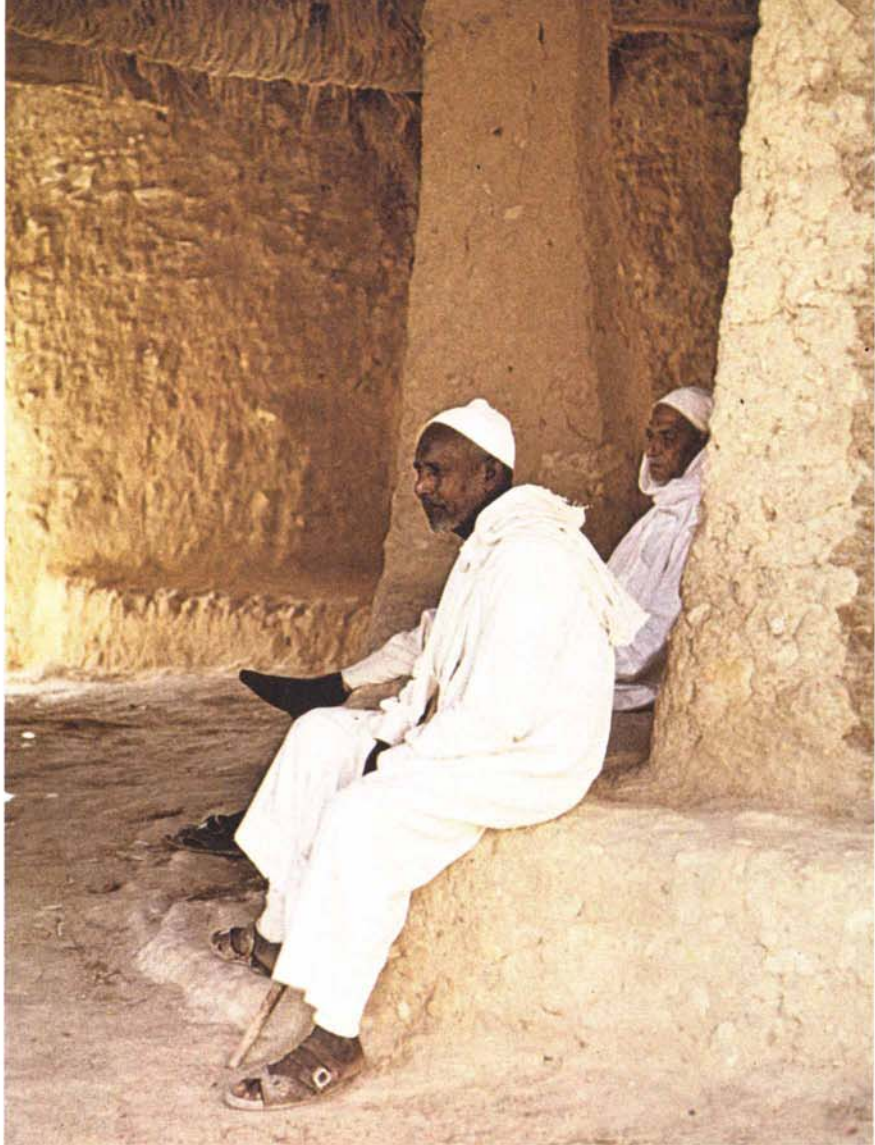
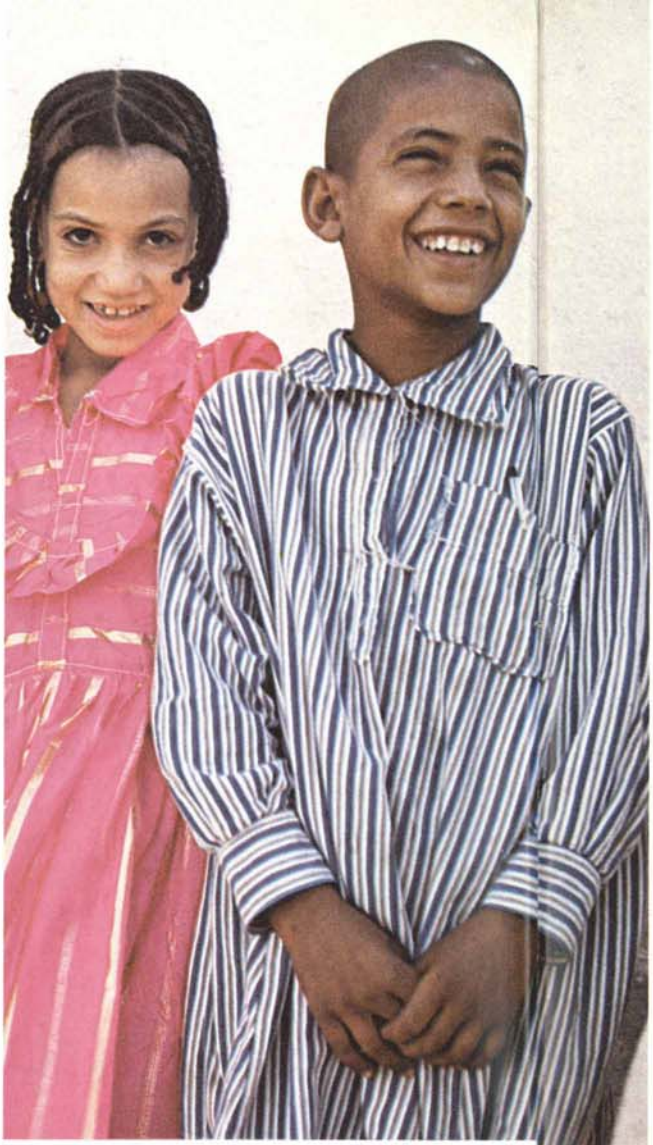
The power of wind abrasion is limitless. In the act of separating grains of sand from their mother rock, nature creates sculptures whose beauty cannot be duplicated by the most inspired human hands, and so, in a dry, hot windy desert climate like that of the Siwa area, we found beautiful weathered land forms. Natural bridges arch next to spindle rocks that seem to be balanced on tiptoe. Near the western edge of the depression, natural erosion has created numerous conical and pyramidal hills. Some of

them reminded me of the stepped pyramid of Saqqara, and I wondered if the ancient Egyptians had studied such natural structures before deciding to erect their own monuments in this most stable of forms.

There has been a meteorological station at Siwa since the early 1940's that provides important data about local wind erosion, sand movement and the rate of dune migration. Since these are important aspects in our study of deserts, we visited the station, whose instruments include an evaporation tank, to measure water loss to the dry desert atmosphere, and a sunshine recorder. If the sun disappears behind a cloud, this device can record the fact – but all the records we saw showed uninterrupted sunshine. Near a rain gauge we asked the young station meteorologist about rainfall during the past year. His answer was simple: "Zero."

This dryness must be relatively recent, for there are numerous indications that the Sahara was fertile some 7,000 years ago. For example, many rock paintings showing cows and herds indicate that enough grass grew over much of the Sahara for these animals to feed on and that the inhabitants of the region knew the arts of farming and of domesticating animals. Other rock paintings showing giraffes imply that trees may have grown there as well. About 2000 B.C., however, the climate became drier and most people apparently moved south to more fertile lands.

There is one obvious suggestion of rainfall in times past in the Siwa Depression. The old village of Siwa is clustered atop a hill, as if to avoid the floods that must have followed torrents of rain. In a similar setting is al-Qara, about 60 miles northeast of Siwa, though founding a village on a hilltop may also have served as a defense against unwelcome intruders. Al-Qara village reminded me of the pueblos built on the Arizona mesas. Both were built of dried mud bricks,



*Clockwise from top left: A young Siwan girl and her brother; a communal gathering place in the old village of Siwa; the ruins of a temple to the god Amon, the sun god, to which Alexander the Great once came to consult an oracle; the old mud and thatch suq; an overview of the ruins of old Siwa.*

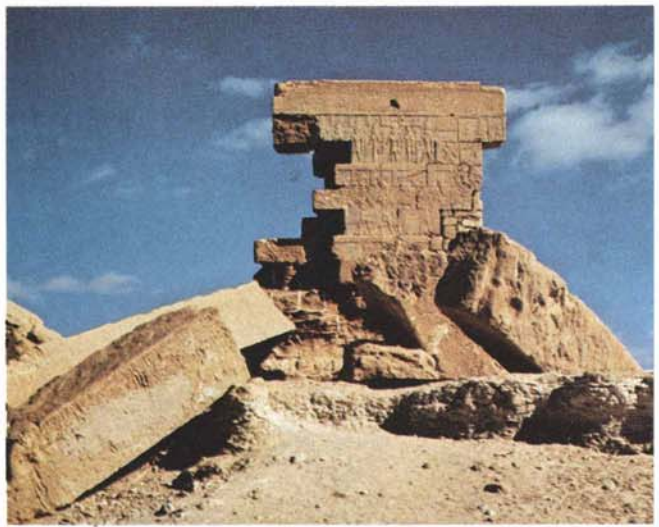
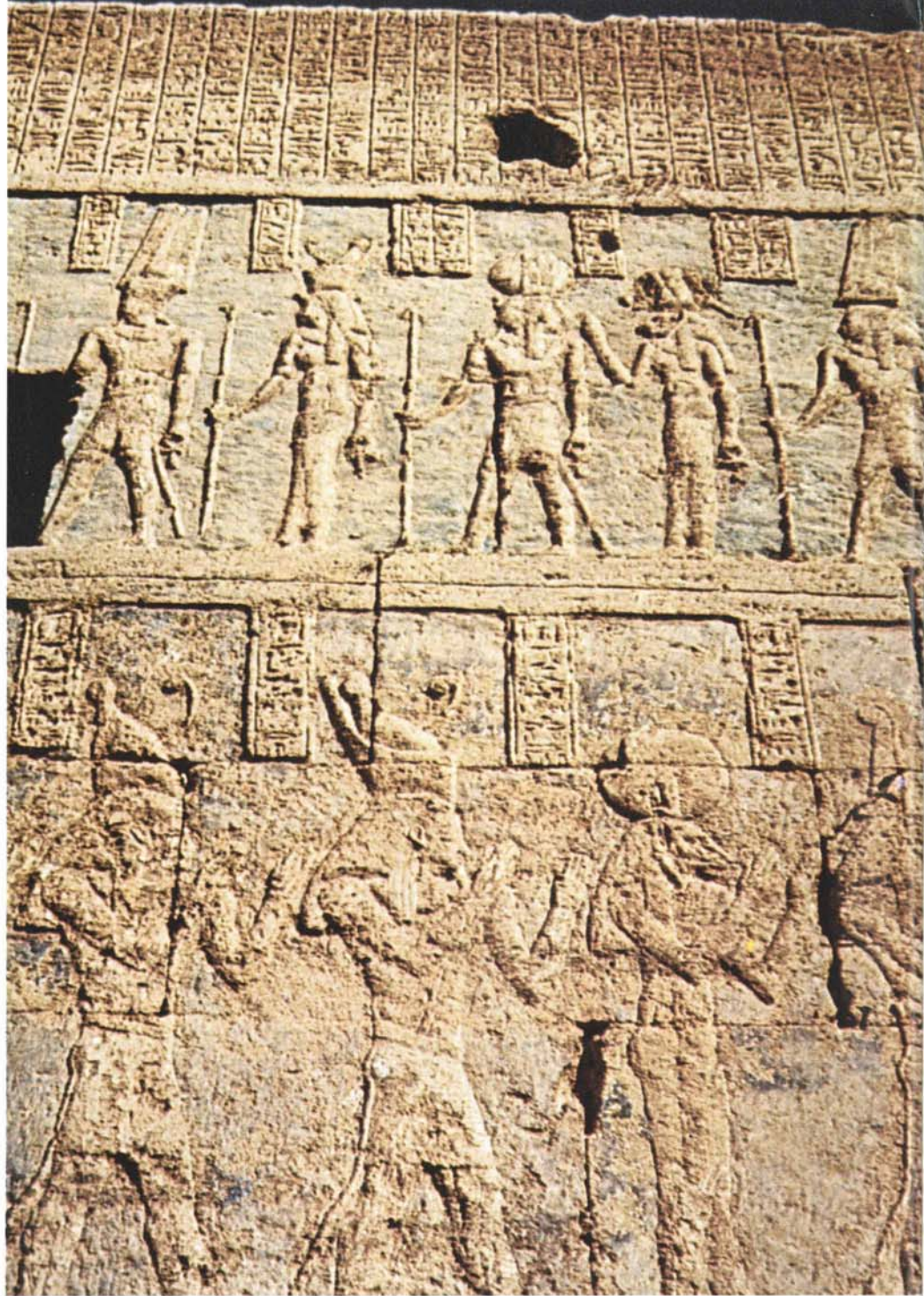


the pueblo multi-storied to house an entire community, and al-Qara composed of clustered, individual one- or two-story shelters.

As a break from our geological studies, the mayor of Siwa suggested a visit to the fabled Temple of Amon, one of the reasons why Siwa has always been an important town despite its size. Only one wall of the temple remains standing today, but the decorative carvings, painstakingly created by the ancients, are still visible. Most of the paint once used on the carvings has weathered away, but what remains adds color to the ruins, and the whole still has great beauty and majesty. It also has a minor scientific association. The priests of Amon here burned camel dung as fuel, like most desert dwellers. The soot that settled on walls and ceilings contained white crystals that came to be called "sal ammoniac" – the salt of Amon. The gas from this salt is what we know today as ammonia.

We turned back from tourists into geologists as we left the temple, for strewn near it were blocks of beautiful Egyptian alabaster, a stone the ancient Egyptians carved into beautiful objects (See *Aramco World*, September-October 1978). Since these blocks were the size of a large office desk, it was not likely that they had been brought here from Bani Suwaif in the Nile Valley, where this type of alabaster is still found; there had to be a local source. We located a 10-foot thick layer near the top of a nearby hill, called Jabal Takrur. It was deposited over 20 million years ago, in layers, radially and in grape-like "botryoidal" clusters.

Twenty miles to the west we saw a very bright rock atop a hill almost completely covered by an advancing sand dune. We climbed the hill to study the dune and to see if the bright layer was also alabaster. One stroke of Dr. Abdel Rahman's hammer brought a familiar ring: it was marble, and its snow-white color and the numerous



Above: One wall of the Temple of Amon, the Egyptian sun god, still stands in Siwa with its carvings and even traces of ancient paint still intact. Left: Near the temple the geologists found blocks of fallen stone identified as calcium carbonate rock and called Egyptian alabaster.

embedded fossils made it one of the most sought-after varieties.

It was not only geological interest that drew us to Jabal al-Mawta, the Hill of the Dead. It is made of marl, a limestone mixed with clay that makes it relatively soft, and this composition may have determined Jabal al-Mawta's use. The hill is laden with rock-cut tombs from Roman times. The upper levels reveal large, symmetrically carved tombs. Inside are human bones, their surfaces polished by the winds of a thousand years. The lower levels of the hill also expose Roman graves, these perhaps for the less distinguished citizens, for they were dug haphazardly and without form.

Standing atop the Hill of the Dead, we were impressed by the magnificent panorama. To the north were table mountains that led to the limestone plateau; to the west were the conical and pyramidal hills; to the south the luscious green fields, beyond which sand dunes spread as far as field glasses could reveal; and to the east were more graves, beyond which Birkat Zaitun, Olive Lake, sprawled in silence.

Zaitun may be the largest lake, but it is not the only one. There are half a dozen or more smaller lakes, depending on the season and the corresponding evaporation rate. The lakes are salty but they originated from sweet underground water. The erosion that created the depression carved the rock down to 100 feet – in some places 200 feet–below sea level. This allowed underground water reservoirs to spill some of their reserves onto the open ground. In the Siwa Depression alone there are about 200 springs that water the fields and groves.

Most residents of Siwa are farmers. Their harvests include excellent dates and olives in addition to oranges, grapes, wheat and vegetables. But there is much waste of the underground "fossil" water, which does not seem to be replenished by any natural flow. Wells are peppered throughout



the depression, each farmer digging his own 30 to 100 feet deep to tap the reservoirs below. The water rises by its own pressure and then flows unhindered into a walled pool, and the farmer simply pulls out a plug from a hole in the pool's wall to water his fields.

The water, of course, flows continuously into the pool whether it is needed or not; much of it evaporates, and the natural salts in it are concentrated. In low-lying parts of the fields, the water quickly becomes saturated with salts—it cannot drain into the soil because of a non-porous shale layer under the depression – and the salts left by evaporation form a crust on the land. The Siwan farmers use special broad-bladed hoes to scrape off the crust before they plant, but it was similar misuse of salty water that ruined the once lush fields of Mesopotamia. There, land that once produced wheat and then barley each season became arid about 2000 B.C.

The inhabitants of Siwa are very tenacious. They have managed to live in their nearly isolated environment for thousands of years, and have even developed a dialect of their own, a mixture of Arabic, Berber and some other elements. The oasis has been a crossroads for many different peoples: ancient Egyptians, Greeks, Romans, Berbers, Carthaginians, Africans, and Arabs. Today about 7,000 people live there, under the leadership of nine local shaikhs. Most of the children

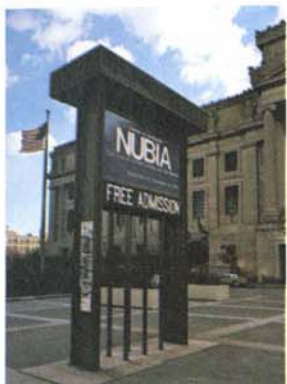
attend schools, and two girls from Siwa are studying at the University of Alexandria – no small achievement for people from a remote oasis town without radio or television, and where mail and the pilot's newspaper arrive by plane twice a week.

The Siwans learned about our study visit while we were there and three meetings were arranged as it became known that I had played a role in the Apollo exploration of the moon. First I met with the school children, then the townspeople, and then with the nine shaikhs. At the last meeting, a thoughtful old man looked at me and said, "Doctor, I wish to start by telling you that I emphatically reject all the tales of space travel. No missions to the moon were ever made; what we heard were fabricated stories. This is what I believe. Now, you start from there." I presented my case, and our discussion went on far into the night.

The following day, the shaikhs invited our group to dinner at sunset, when the day had turned cooler and serene. We were led through planted fields to an open-ended structure whose walls and roof were made of palm fronds, and there we were treated to *mashwi*, a whole sheep cooked on a spit and flavored with sweet-smelling herbs. Our hosts honored us by serving us themselves, and only joined us for the dessert of oranges and bananas. For me, the high point of the evening came when the same man who had questioned space flight the night before told me, "I now believe your stories of astronauts and the moon." I was glad he did, for our researches at Siwa, coordinated with observations from space, might someday help the Siwans to a better life.

Farouk El-Baz, born in the Nile Delta, graduated from Cairo's 'Ain Shams University and went on to the University of Missouri and M.I.T. As America's space program took shape, Dr. El-Baz became the astronauts' instructor in geology and helped choose lunar landing sites. He also worked with NASA as director of the Apollo-Soyuz Earth Observation and Photography Experiment.





# The Nubians in Brooklyn

WRITTEN BY WILLIAM H. ROCKETT  
PHOTOGRAPHED BY NICHOLAS KOURIDES  
MAP BY NEVILLE MARDELL

Ten years ago, Egyptian engineers threw the switches that closed the huge gates at Aswan and completed the Sadd al-'Ali, the Aswan High Dam, largest of the Nile dams. As a result, one of the world's biggest man-made lakes began to form above the river's First Cataract, south of the city of Aswan.

As it filled, the lake, called Lake Nasser, slowly drowned what Egyptologist Diane Desroches Noblecourt called "the greatest open-air museum in the world." Her reference was to Lower Nubia—that is, northern Nubia—a civilization which took root 500 years before the pyramids rose at Giza, and which sustained itself in full flower until some time after Columbus reached the New World.

Until very recently, however, Nubia—part Africa, part Egypt—has been one of those famous areas that none but the experts could locate and identify precisely. Although it has been as thoroughly examined by the archeologists as any area in the world, Nubia, to the layman, was a source of confusion, both geographically and historically. Wasn't Nubia part of Egypt? Aren't its great temples Egyptian? On the other hand, isn't Nubia, today, part of The Sudan? And what about the African influences?

Such questions have now been answered. In a special exhibit organized by the Brooklyn Museum last year, the story of Nubia has been pieced together from exhibits in 25 of the world's museums from Khartoum to Warsaw. Called "Africa in Antiquity: the Arts of Ancient Nubia and The Sudan," the exhibit drew 100,000 people to the Brooklyn Museum last year and is now on a tour that will end in The Hague in The Netherlands in September.

"There has never been an exhibition like it," says its curator, Bernard V. Bothmer. "We know so little about Nubian art and history. In fact, there have been no real books on the subject, until the catalogues of this exhibition. Nubia has always been overshadowed by Egypt; now, we are beginning to see it on its own merits, as a great African culture."

"There has never been an exhibition like it... we know so little about Nubian art and history..."



Museum of Fine Arts, Boston.

Geographically, Nubia is the area along the Nile between the First Cataract, in Egypt, and the Sixth Cataract, in The Sudan, just north of Khartoum. Because many of the cataracts are virtually unnavigable, Nubia was protected from central African incursions and, because of an error, was never fully explored by the Romans. Like the Greeks, they knew it vaguely, as the far periphery of the known world; and under the Emperor Nero, Rome did send two expeditions south, according to Seneca and Pliny. But as the expeditions foolishly traversed the deserts to the west of the rich Nile Valley itself, they returned empty-handed and Rome lost interest until later. Nubia, therefore, safe behind its cataracts, continued to maintain an unbroken thread of culture first spun in the Nile Valley 5,500 years ago.

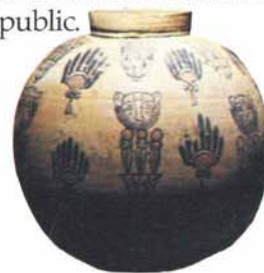
In 1890, however, construction of the first Aswan dam ended that isolation and when the dam was heightened in 1907, the Egyptian government asked George Reisner, an American archeologist, to survey the area to be flooded. Reisner did so and in the next five years scientists from many countries recorded and saved what they could as the floodwaters rose over that part of northern Nubia.

The archeologists returned again in the 1930's—when the dam was heightened for the second time—but it was the 1950's proposal to construct the new High Dam, and the threat of its much larger lake, that shook the nations awake at last. (See *Aramco World*, July-August 1976) When Egypt's Ministry of Culture appealed to the world for help, and men like Walter Fairservis wrote books like *Ancient Kingdoms of the Nile* (subtitled "The Doomed Monuments of Nubia"), the world's statesmen recognized the need to preserve the temples and monuments. As a result, archeologists and historians from more than 30 countries poured into northern Nubia. Temples were taken apart stone by stone, to be reassembled in other lands—like Dendur, now in New York City—or rebuilt on higher ground, like Abu Simbel.



Museum of Egyptian Antiquities, Cairo.

But more was accomplished than monumental moving jobs. Taking up the work of Reisner, the archeologists learned more about Nubia in a decade than had been learned in all the long centuries before Egypt announced its plans to build the Sadd al-'Ali. Earlier, to be sure, J. W. Crowfoot had explored the "Island of Meroe"—the part of Nubia, in today's Sudan, bounded by the Nile, the Blue Nile and the Atbara River—and 90 years before, Champollion, the decipherer of the Rosetta Stone, had pushed south of the Second Cataract into Sudanese Nubia. But it was not until the pre-High Dam period that Nubia as a whole was explored thoroughly. And it was not until the Nubian Exhibit in Brooklyn that the results were condensed, coordinated and made public.



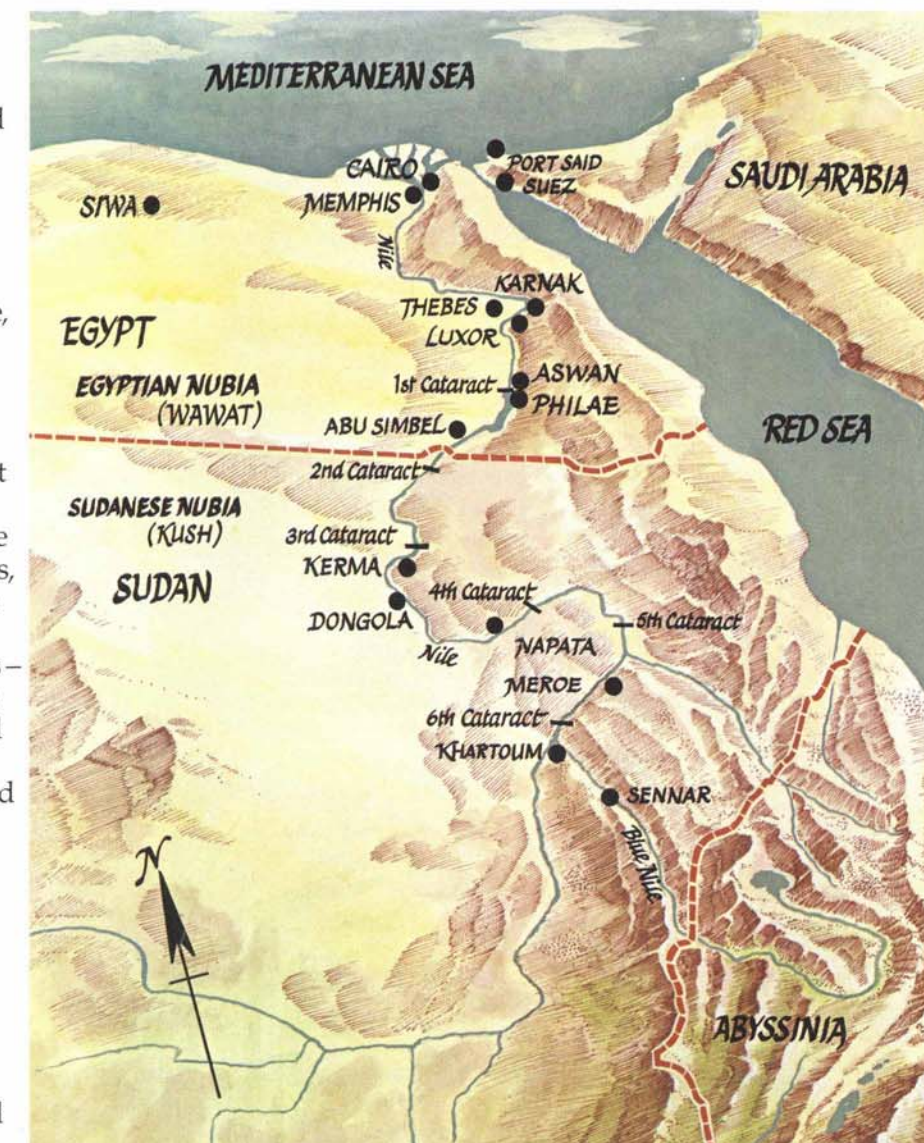
Ashmolean Museum of Art and Archeology, Oxford.

As the exhibit shows, the Nubian civilization began about 3500 B.C. when the first Nubians—archeologists call them the "A-group"—moved out of the Stone Age, began to raise crops and animals, and began to create works of art. They probably engaged in trade too, acting as middle-men between the sources of ivory, ebony and incense in central Africa and their key customer in the north: Egypt.

The Egyptians, then, were the source of much of what is known of the Nubians. Although a questionable source—the Egyptians considered Nubian territories, called Wawat and Kush, as places of riches, ripe for plundering—they did provide important data about the early centuries. During Dynasty IV, for example, (2680-2565 B.C.) the Pharaoh Snefru once boasted that he "brought back 7,000 prisoners, and 200,000 cattle, large and small."

Snefru, however, was not the first lord of the northern Nile Valley to plunge southward to Sudanese Nubia—called Kush—in search of ivory, gold, and the plumes and eggs of ostriches. Records show that Egyptian

Opposite: A 58-inch granite statue of King Senkamanisken (643-623 B.C.) wearing a kilt and sandals. Left: A Meroitic clay beaker, a little over three inches high, decorated with two crocodiles. It is 1,700 to 1,800 years old. Below: Painted lion faces, lotus flowers and uraeuses decorate this 7½-inch clay pot from the first century.



expeditions into Nubia date back to the very first Egyptian dynasty: about the year 3000 B.C. And by the time of Cheops, builder of the greatest of the Giza pyramids, Egyptians had secured a site near the Second Cataract at Buhen, where they mined Nubian gold for themselves—apparently with forced labor. "If I lie," runs one lament, "they will cut off my nose and my ears—or they may send me to Kush."





University Museum, Philadelphia

The note of dismay in that comment was well founded. The terrain between Kush – Sudanese Nubia – and Egypt did not encourage immigration. As described by Sir Samuel Baker, one of the men to find the source of the Nile in 1864, it sounded dreadful,

*Glowing like a furnace, the vast extent of yellow sand stretched to the horizon... hills of black basalt jutted out from the barren base of sand, and the molten air quivered on the overheated surface of the fearful desert. 114 degrees Fahrenheit in the shade under the waterskins; 137 degrees in the sun... We entered a dead level plain of orange-coloured sand, surrounded by pyramidal hills: the surface was strewn with objects resembling cannon shot and grape of all sizes... the spot looked like the old battle-field of some infernal origin.*

About 2300 B.C., however, Mernera, a pharaoh, cut a channel through the First Cataract, Egypt's traditional southern boundary, and opened Egyptian Nubia – called Wawat – to exploitation. Subsequently, Egyptian nobles began to lead expeditions southward to explore and plunder the region – rather like English gentlemen in the same area in the 19th century – and to send back “souvenirs” to the pharaoh. One noble, named Harkhuf, sent word of a “dancing dwarf” – probably an African pygmy – and won such an excited reply from the pharaoh that Harkhuf engraved it on his own tomb at Elephantine,

*Come northward to the court immediately: thou shalt bring this dwarf with thee, which thou bringest living, prosperous, and healthy from the land of spirits, for the dances of the god, to rejoice and gladden the heart of the King of Upper and Lower Egypt, who lives forever. When he goes down with thee into the vessel, appoint excellent people, who shall be beside him to take care lest he fall in the water. When he sleeps at night appoint excellent people, who shall sleep beside him in his tent; inspect him ten times a night. My majesty desires to see his dwarf more than the figs of Sinai and of Punt.*

It was a Middle Kingdom pharaoh, Senwosret III, who moved from exploitation to conquest; he invaded Wawat – Egyptian Nubia – and pushed his imperial borders as far south as Semna in Kush. He built forts with names like “Repelling the Tribes” and “Taming the Deserts” during his 36-year reign (1878-1842 B.C.); eight of the forts covered the length of Wawat, and an additional six are said to have studded the *Batn al-Hagar*, or “Belly of Stones,” the long reach of rapids and narrows of the Second Cataract. This great natural defense marked the limit of Egyptian expansion and

prevented them from pressing the Kushites too hard in their rising cities of Kerma, Napata, and Meroe – in today's Sudan. Still, Senwosret the conqueror so impressed the Nubians that he became a god, worshipped there for centuries after his death.

The people who inhabited Wawat at this time have come to be called the “C-group” by archeologists. Steffen Wenig, author of the exhibition catalogue's second volume, tells us they wore feathers in their hair, built permanent homes and sophisticated tombs, and rarely illustrated human figures on their pottery or in the clay figures they made, preferring cattle and sheep as subjects. Some human figures have been found, however – most of them female – and their marked resemblance to “A-group” finds are testimony to Nubian cultural continuity – a continuity that, curator Bothmer feels, may, in some aspects, reach into the present day.

While the Egyptians easily dominated the “C-group” Kushites, they were much more interested in a nation even further south in Nubia. Called Kerma in today's archeology, this area was known to the Egyptians as Yam or Iram. Its proud and independent people were ruled by princes who practiced elaborate burial rites. While the “C-group” peoples of Wawat were content to take clay figures of animals with them into the afterlife, the Kerman prince was laid to rest on a bed inlaid with beautiful ivory carvings, and surrounded by the corpses of real animals and of human retainers. In one burial mound at Kerma, 322 skeletons were found and, Wenig says, “It is clear from the unnatural positions of their skeletons that the



British Museum, London

victims were buried alive and suffocated to death.” The Kermans produced sophisticated art, developed a complex and successful political state and ultimately founded an empire.

To the Egyptians, of course, the people of Kerma appeared as a powerful and aggressive force and so they took protective measures. At Mirgissa, near Wadi Halfa on the Second Cataract, archeologists have found the equipment of one of many magicians sent south by the pharaohs to man lonely outposts and recruit spirits to defend Egypt against her enemies. And while the Egyptian pharaohs dominated both Kush and Wawat for a time – from 1554 to 1080 B.C. – the imperial peace was not an easy one.

The Egyptians tried everything to force Kush to submit. Aswan walls tell of a massacre of rebels against Pharaoh Thutmose I (1530-1515 B.C.), in which everyone save the son of a local chieftain was murdered. He was brought as a prisoner to the pharaoh, and probably enrolled in a kind of finishing school for the young nobles of conquered countries, at which they were effectively Egyptianized – on the theory that a shared culture would make them less likely to lead future rebellions against their imperial masters.

In one respect the attempted Egyptianization of Kush was successful: the Kushites came to claim Egyptian culture and religion as their own. In the eighth century B.C., in fact, they came north in force to claim it – and for nearly a century ruled Egypt themselves.

This Kushite reign in Egypt is known to historians as Dynasty XXV. From 751 to 656 B.C., the men from the south ruled Egypt's Upper and Lower Kingdoms. They wore curious caps adorned with two serpents, the bodies of which swirled together over their heads and trailed from the back. These snakes were not representations of the two Egypts, but of Egypt's unification with and under the Kushite kingdom of Napata. A power based on two great cities – Meroe and Napata – that kingdom had emerged when Egypt, weakened by a series of costly foreign wars, withdrew from the south to regroup her forces. As Egypt subsequently took little notice of events in the south, the two cities, Meroe and Napata, borrowed the name of Kush from the Egyptians, consolidated their forces and later, under a leader named Piankhy, conquered Egypt.

Piankhy, then, was the first Kushite pharaoh. But it is Taharqo, his successor, who has come to symbolize Dynasty XXV for many historians



University Museum, Philadelphia  
Opposite: This sandstone head with sun disk is probably the head of a “ba-statue.” It is shown slightly over life size.  
Left: A nine-inch ring flask, the only one known from the Meroitic period. Above: A 13-inch-tall jug decorated with three winged cobras.





Ashmolean Museum of Art and Archeology, Oxford.



Museum of Fine Arts, Boston.



British Museum, London.

Above, top: A clay box with a painted "basketwork" design. Center: A human-headed sphinx, nine inches high. Above: King Taharqo's granite sphinx, from 25th-dynasty Egypt, has lion's ears and a mane.

and archeologists. It is his sphinx which dominates the posters and pamphlets of the Nubians in the Brooklyn exhibition, and which is for many the most moving work of the entire display.

Crowned at Memphis and seated at Thebes, Taharqo was a Napoleon of a general; he once led Egypt's forces to meet the Assyrians in Palestine. But, like Ramses II, who constructed Abu Simbel, Taharqo built as an Egyptian. "The [Kushite] rulers made every effort to correspond to the image of legitimate pharaohs," writes Karl-Heinz Priese in the essay volume of the exhibition catalogue. Official art and literature, in Egypt and in Kush itself, were used to give background and history – and thus legitimacy – to the new dynasty.

And yet, hard as Taharqo worked to appear to be an Egyptian pharaoh, one look at his sphinx makes it clear that he is definitely Nubian, not northern. As Wenig points out, foreigners had often sat on the Egyptian throne before, but only the Napatan pharaohs *looked* foreign in their sculptured likenesses. Some art historians have referred to "the brutal realism of Kushite art," but that may be too simple a judgment: Kushite art also shows the pride of a people who believed in themselves and in their own imperial power. It reflected, as an example, the confident strength of the Kushite pharaoh who once sent the Persian king a bow with this message,

*When the Persians can pull a bow of this strength thus easily, let him come with an army of superior strength against the long-lived Kushites – till then, let him thank the gods that they have not put it into the heart of the Kushites to covet lands which do not belong to them.*

In short, the Kushites' efforts to identify themselves with the Egyptian past was not an effort to pass as their betters, but to identify with their equals. When, for example, the Kushite king Sahura modeled a victory stele on one raised by Pharaoh Pepy II 2,000 years earlier, he was showing that he knew the

efficacy of having a little solid history behind him – but history of which he was the proud and legitimate heir. (He may, in fact, have been inheriting his own history; although the Brooklyn exhibit does not touch on it, one University of Chicago archeologist believes that Nubian culture was the *basis* of Egyptian political organization.)

Altogether, the Kushites ruled Egypt for

95 years. Then the Assyrians drove them from Memphis and Thebes – the seat of pharaonic rule – and tried to conquer Kush itself. The Assyrians failed, however, as did the Persians, 150 years later. The Kushites were also tough enough to retake the city of Aswan from the Romans in 24 B.C., and to prevent them from capturing Kush. As a result the Emperor Augustus chose to sign a peace treaty with Kush that lasted 300 years.

By 270 B.C., nevertheless, the Kushites were on the defensive; this, apparently, is why they moved their capital south to Meroe, where the kingdom survived until that city fell in A.D. 350.

For archeology the fascination of the story of Kush derives from the mixture of African and Egyptian influences. "It's not African and it's not Egyptian," says Bothmer. "It is Kushite, or Nubian. And it is fascinating because it is so very old, but to us it is so new."

Nor is it dead. The exhibition's opening in Brooklyn last year was presided over by President Gaafar al-Nimeiry of the Democratic Republic of The Sudan, whose minister of culture and information has said that the exhibit "reflects the cultural heritage of our people." The Sudanese view Nubians as their progenitors, and value Kushite artifacts as an Egyptian values Giza.

Furthermore, Dr. Negm el Din M. Sherif, Sudan's commissioner for archeology and national museums, is anxious to encourage archeological expeditions to southern Nubia, the heart of the kingdom of Kush. "At the moment, there is not one American expedition working there," says Floyd Lattin, coordinator of the Brooklyn exhibit. "It is an ironic situation, considering the fact that George Reisner of Harvard was the great initiator of Sudanese archeology."

Yet the potential rewards of new digs in southern Nubia could be great. Much is left to be uncovered. For one thing, the archeologists have yet to decipher the language in which many Nubian inscriptions have been written. Meroitic, as it is called, is similar to ancient Egyptian writing, but isn't really understood yet.

Somewhere in Kush – perhaps in the royal cemeteries at Meroe – there may exist a Nubian Rosetta Stone. But until it is found and the language has been unlocked, the evocative forms and shapes of Nubian art will be the best source of understanding of this proud old civilization.

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Staatliche Sammlung Ägyptischer Kunst, Munich.

Almost two inches broad, this gold and enamel armlet, above, comes from the pyramid of Queen Amanishakheto at Meroe. The winged goddess is Mut. At right is a shawabti of King Taharqo holding two hoes in his hands. Shawabtis were statues placed in tombs to do work in the hereafter.



The Brooklyn Museum, Brooklyn.