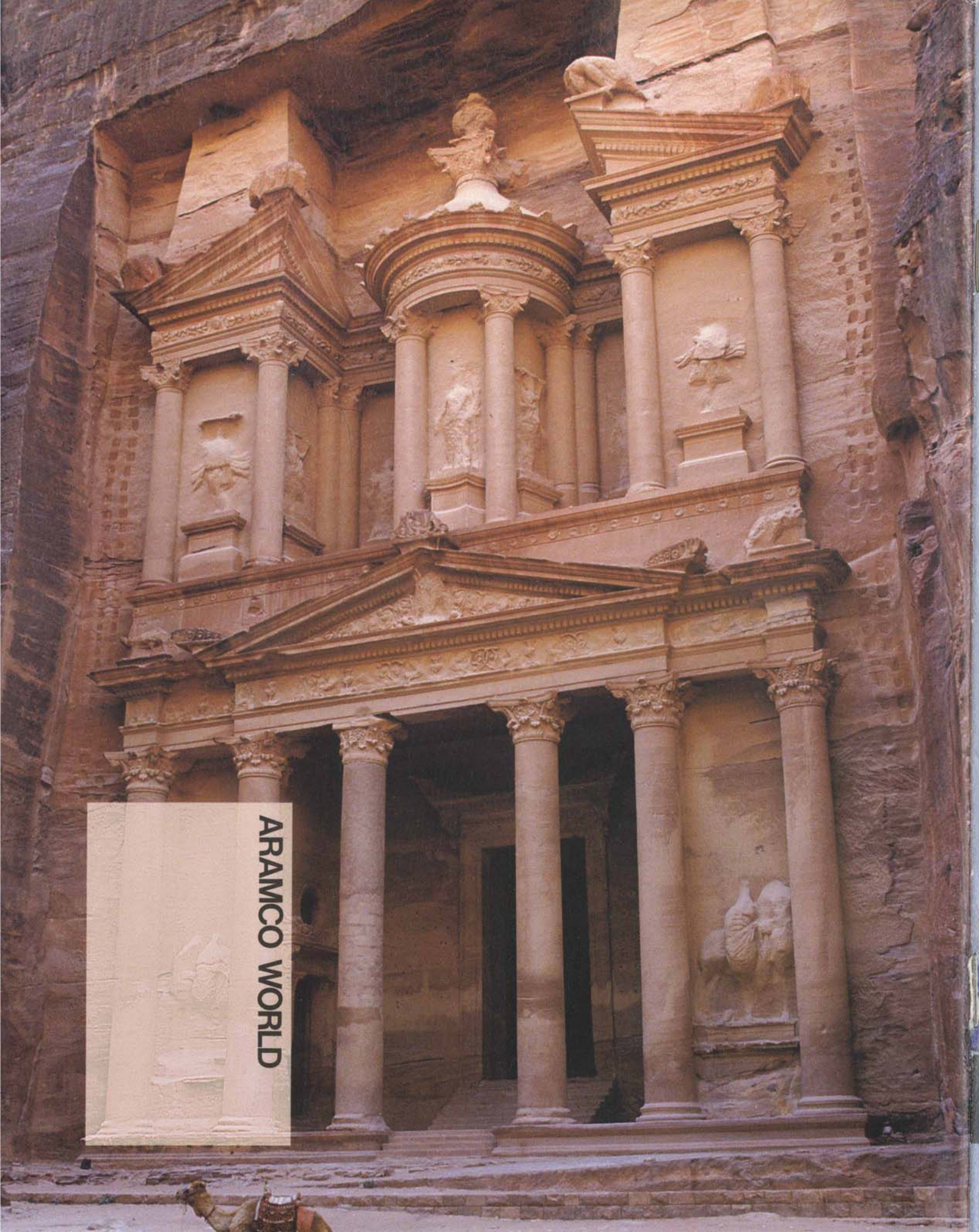

ARAMCO WORLD

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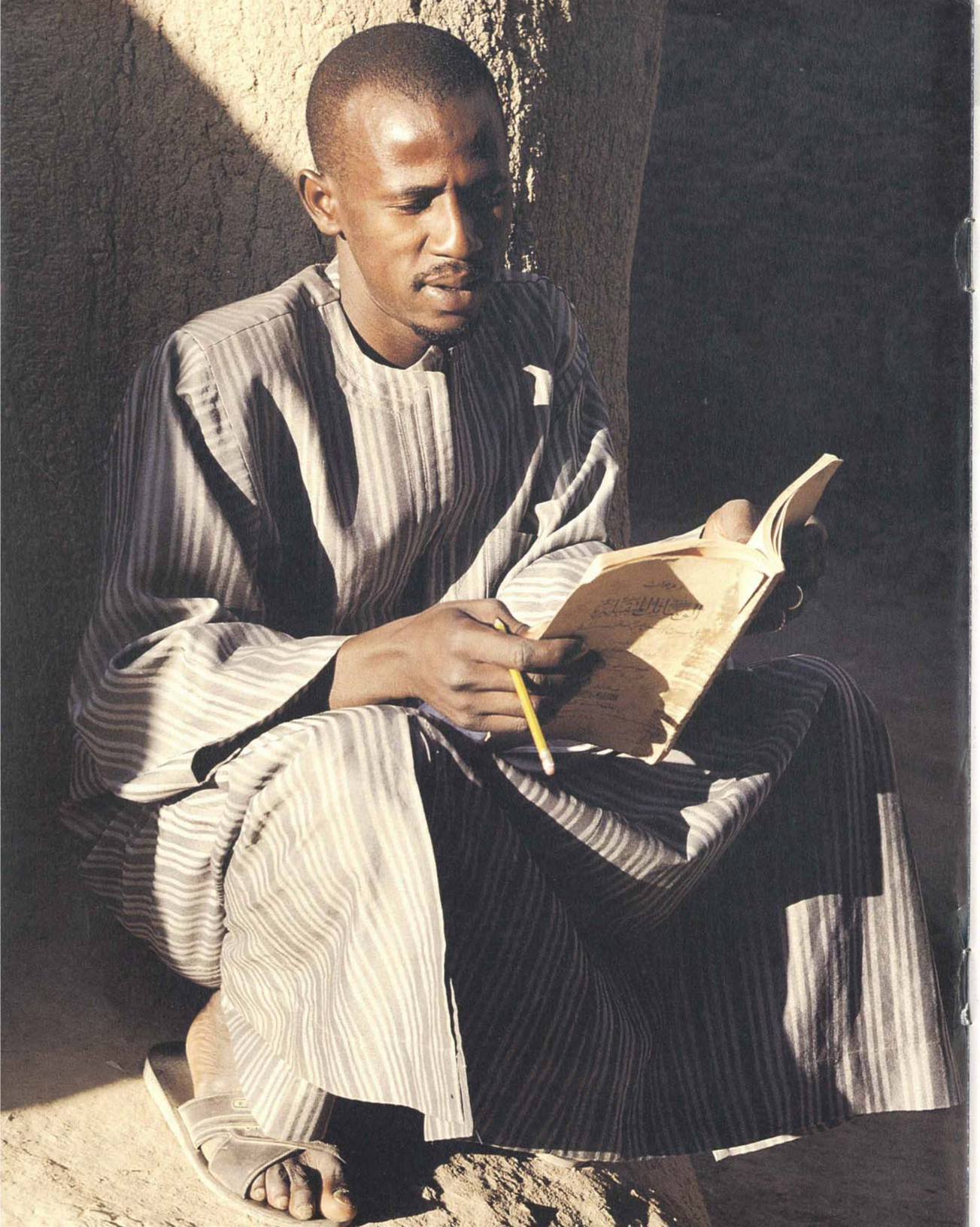
SEPTEMBER-OCTOBER 1991

SAFE HAVEN FOR BIRDS



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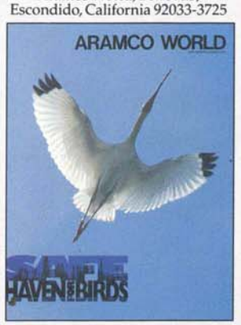

Cover: Black-tipped primaries and down-curved bill identify a white ibis (*Eudocimus alba*), neck extended and legs back in characteristic flying position. The species, which ranges into Central and South America, is one of many that inhabit the wildlife refuge at Star Enterprise's Port Arthur Plant in East Texas. Photograph: Dan Guravich. Back cover: The facade of the misnamed but majestic "Treasury of the Pharaoh," a tomb – probably royal – at Petra. Photograph: Vivian Ronay.

◀ A student reviews his lessons in the shade of Djenné's mosque. Photograph: Brynn Bruijn.

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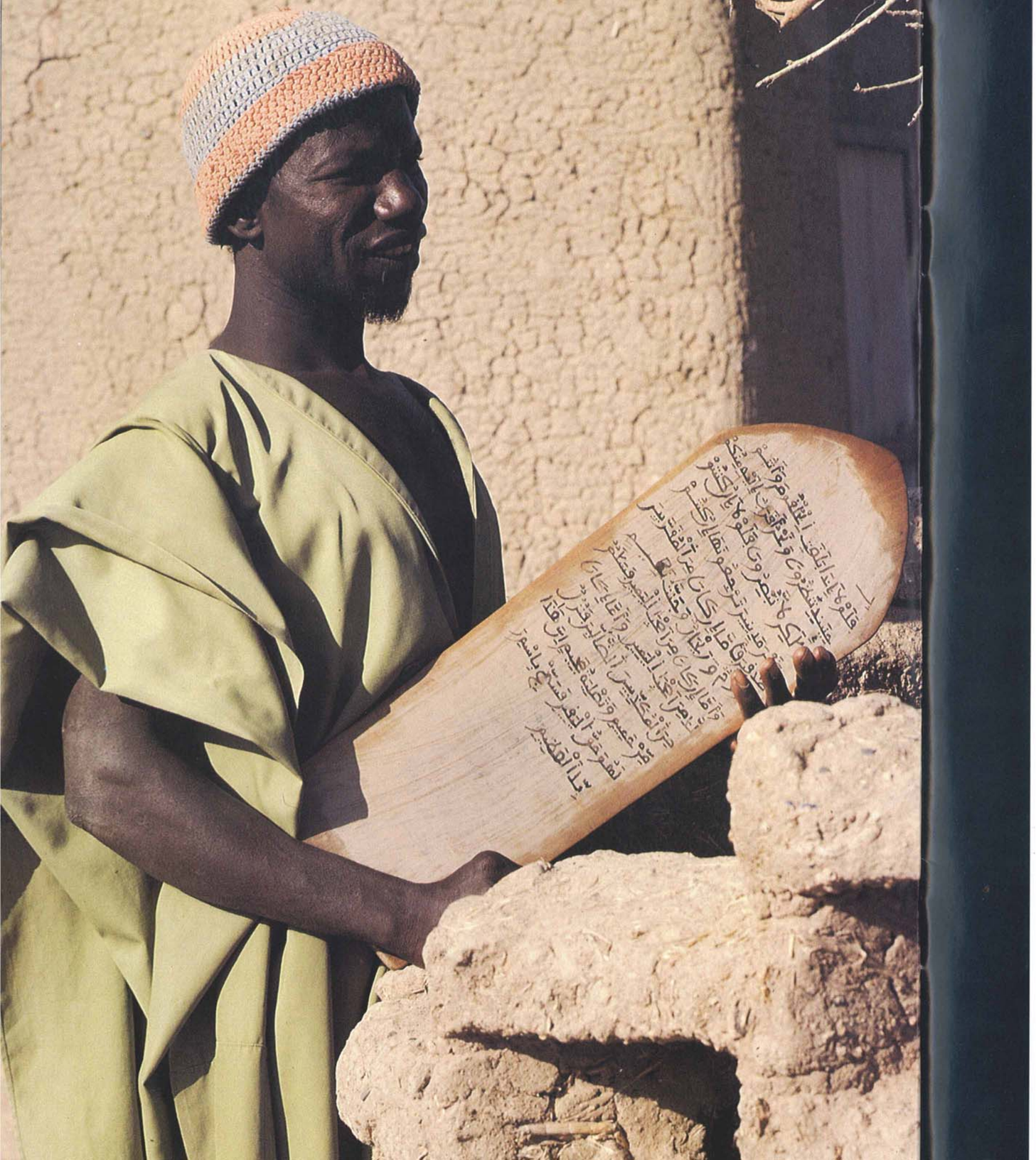
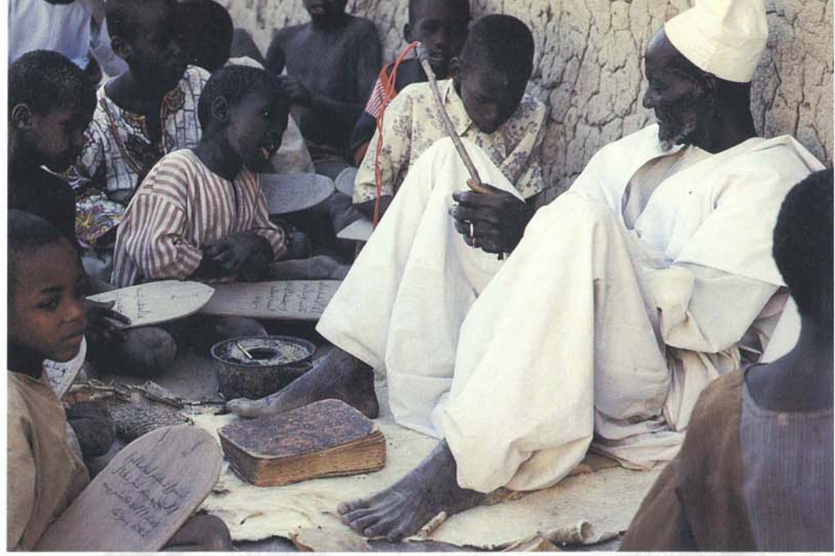




LEARNING THE WORD OF GOD

"Ba, si, mi, alifu, lamu, lamu, ha...."

Beginning as early as age seven and continuing, if circumstances permit, well into manhood, students attend Djenné schools to learn to read, write, recite and understand the Holy Qur'an.

WRITTEN BY GEERT MOMMERSTEEG
PHOTOGRAPHED BY BRYNN BRUIJN

Rhythmically, young Salifou recites his lesson, his finger moving slowly over the Arabic letters on his wooden board.

Around him, the other pupils of this Qur'anic school learn their lessons by reading aloud the words on their tablets; each has his own text and contributes a little to the cacophony. The teacher, the *marabout*, sits on his sheepskin and listens to the recitation. Once in a while he urges his pupils to read more ardently. Some older ones recite briskly long passages from the Qur'an which they have learned by heart, occasionally using their boards, on which verses from the Book are written in a fine, small hand, to prompt themselves.

Walking about the old town of Djenné, in central Mali, means hearing the word of God now and then. While passing one of the dozens of Qur'anic schools, a visitor is almost sure to hear students reciting passages from the holy book.

It has been so for centuries. Djenné, situated in the Inner Delta of the Niger River, was once an important commercial center (See *Aramco World*, July-August and November-December 1990).

Djenné

Although the town was never as famous as its sister, the legendary city of Timbuktu – 350 kilometers (210 miles) to the north – still, during its heyday in the 15th and 16th centuries Djenné played an important role in trans-Saharan trade. It was here that the salt merchants from the desert in the north met the gold traders from the south. "Because of the blessed city of Djenné, caravans flock to Timbuktu from all points of the horizon," the West African historian al-Sa'di wrote about 1650.

Islam was part of urban life in Djenné from an early date. When, at the beginning of the 13th century, the 26th chief of Djenné, Koy Kunboro, proclaimed his conversion to Islam, some 4200 learned Muslims were present, according to the chronicle of al-Sa'di. Although the writer, once imam of the town himself, may have exaggerated, clearly Islam was a significant force in the city at that time, and it remains so today.

Today, Djenné is a small town with some 12,000 inhabitants of ethnically diverse origin – mostly Marka/Sonray, Fulani and Bozo. Economically, it is of only minor regional importance, and the drought of recent years has left its mark here as everywhere in the Sahel. But Djenné's famous mosque and its many Qur'anic schools still reflect the glorious days of the past.

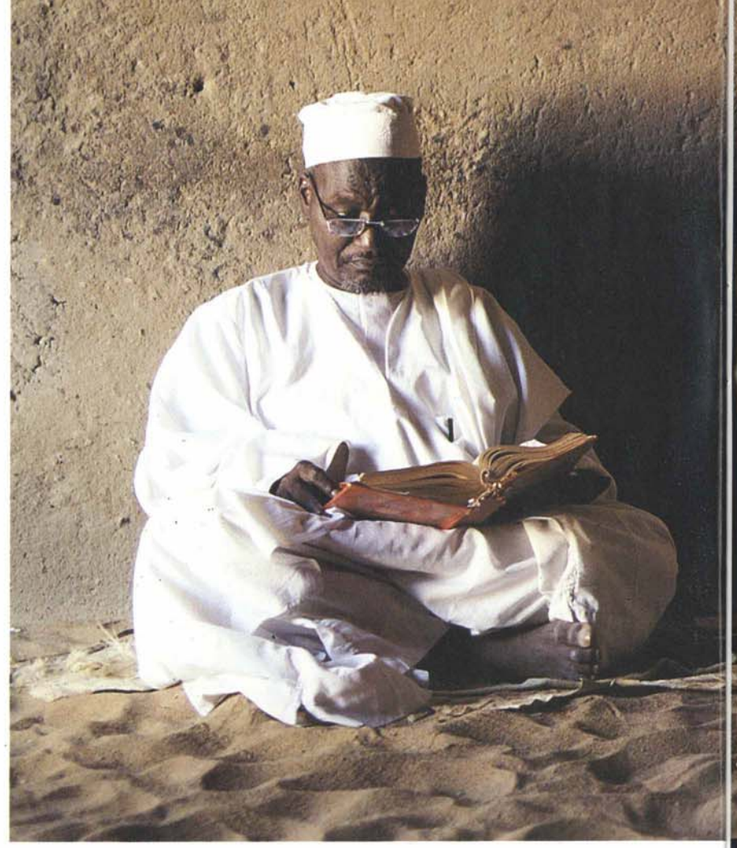
The town has about 35 elementary-level schools where young students learn how to read and recite the Qur'an, as well as half a dozen schools for "secondary" Islamic education. Law, Arabic grammar, rhetoric and literature, theology, the traditions of the Prophet and Qur'anic exegesis are taught at the secondary schools, whose teachers have specialized in advanced studies and are known for their learning. These schools have regional appeal: Young men from throughout the Inner Delta region come to Djenné to study. Many of them stay in town for years and take in their own pupils for elementary instruction, thus establishing yet another small school.

Among the hundreds of students at Djenné's primary Qur'anic schools is young Salifou, diligently naming the first letters of the universal Muslim invocation, the beginning of every endeavor, "In the name of God, the Compassionate, the Merciful": *"Ba, si, mi, alifu, lamu, lamu, ha…."*

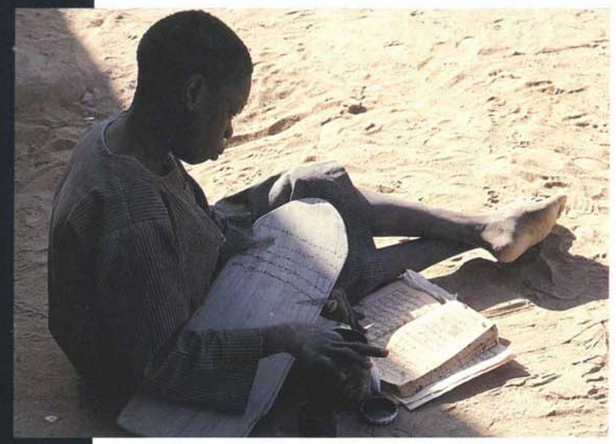
Salifou's school, like most here, is situated in the vestibule of his teacher's house. A layer of sand covering the floor of tamped earth, a collection of wooden writing tablets in a corner and one or two copies of the Qur'an in a niche in the wall distinguish the school from an ordinary vestibule. Class is held from about seven to 11 o'clock in the morning and from three to about six in the afternoon, except on Thursdays and Friday mornings. Only during the hot hours, when the sun is high in the sky, do the marabout and his pupils sit inside; early in the morning, all are seated in the strip of shade at the foot of the school's mud wall, and in the late afternoon, the house opposite shelters them.

The students, most of them boys and ranging in number from a dozen to a hundred or more, do not, strictly speaking, form a class. Teaching is individual. Each student works on his own part of the Qur'an and makes progress at his own pace, according to his intelligence and ardor. Although all girls also follow Qur'an lessons for some time, they are always outnumbered by the boys. With one or two exceptions, girls normally spend only enough time at school to learn the few short chapters of the Qur'an needed for daily prayers.

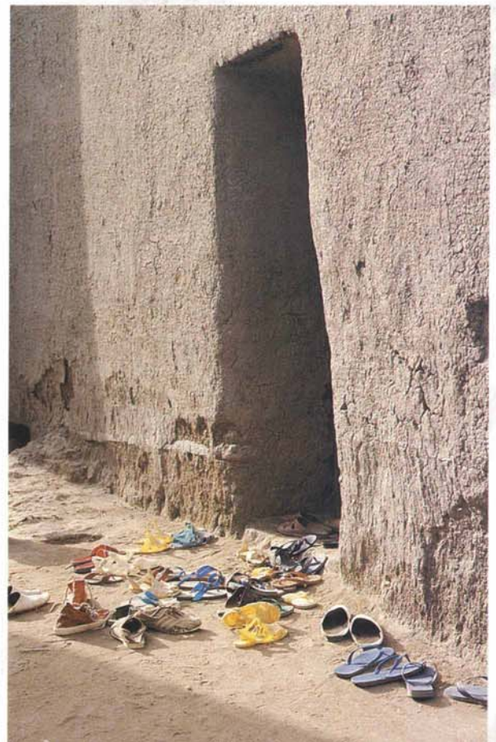
Educational materials are simple: a pen, black ink, and a wooden tablet covered on both sides with a thin coating of white clay, on which the Qur'anic verses are written. The pen is cut from the stalk of a particular shrub and the ink is made of water, gum arabic and soot washed off cooking pots. The older students, who write on their tablets themselves, have their own ink-pots and pens; the younger ones have only tablets. No blackboard or notebooks are used, and there are no books other than the teacher's own Qur'an and one or two extra copies which the advanced students may use.

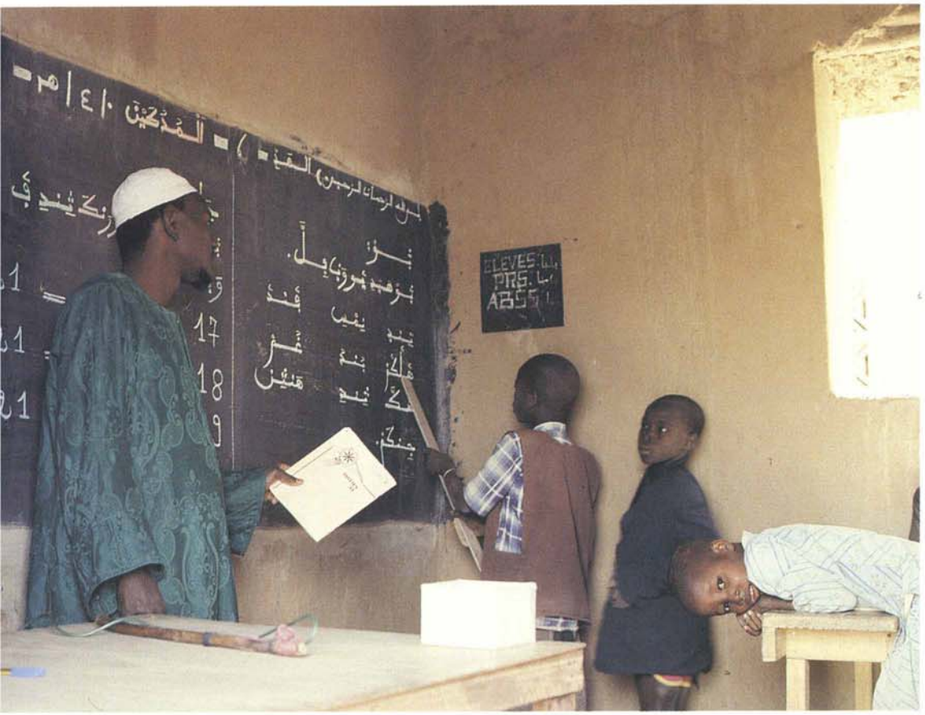


Study of the Qur'an is a lifelong occupation for a *marabout*.



Above, a student checks what he has written on his copy-board against a worn copy of the Qur'an. At right, students' shoes mark the entrance to a teacher's home.



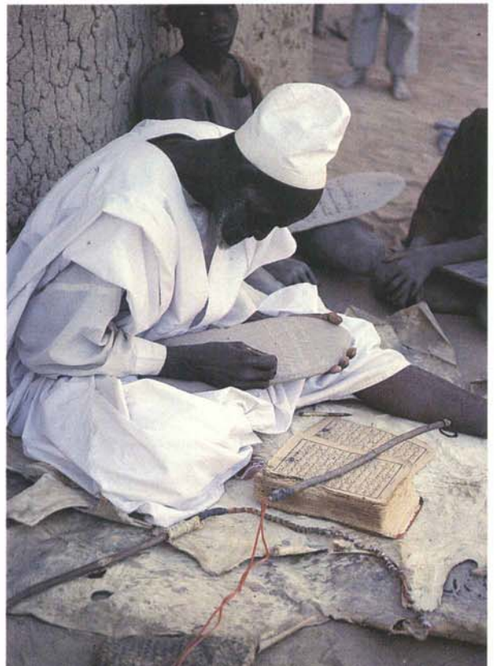


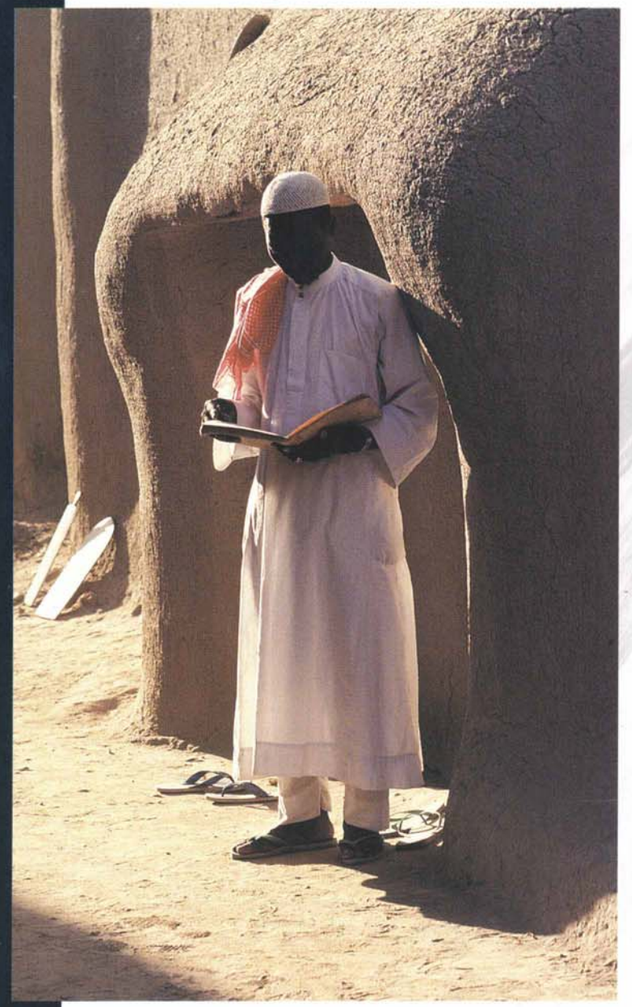
Students may also study Arabic and other subjects in the government's schools. Textbook in teacher's hand reveals continuing French influence 30 years after Mali's independence. Below, a *marabout* prepares a copy-board for tracing.

The advanced students, ranging in age from 11 to 16 years or older, write long Qur'anic passages on their boards in a small, neat hand. Some of them have already read the entire Book and now practice the art of *dursu*. By reciting it over and over, they work to memorize the word of God.

Young Salifou still has a long way to go before he will be able to recite the Qur'an the way the older students do: He is only seven years old. Just a few weeks ago he reached the age at which he could begin his Qur'anic education. Over the past few months, his father had asked him from time to time whether he knew how to count from one to 10. Once Salifou was able to count to 10 without fault, he was old enough to be handed over to a marabout who would teach him to read, recite and later write the Qur'an, the fount of the Arabic language.

Today the marabout has written upon Salifou's tablet several new words of the first two verses of *al-Fatiha* (The Opening), the first *sura*, or chapter, of the Qur'an. Indicating the letters on the board with his finger, the teacher pronounces each one aloud several times, waiting for his young pupil to name them after him. This is Salifou's lesson for the day.





Student reading in a doorway.

While the marabout occupies himself with his other students, Salifou repeats his lesson on his own. Occasionally the teacher or an older student checks on him and helps him with his pronunciation. The following day, the marabout will test Salifou to see if he has learned – that is, memorized – his lesson correctly. If so, the teacher will write the next few words on the tablet, also to be read aloud and memorized.

The first phase of education at the Qur'anic school, during which young students like Salifou memorize the 28 letters of the Arabic alphabet, is called *alifu-alifu*: the *alif* being the first letter of the alphabet. However, the letters are not learned in strict alphabetical order. Starting with Sura al-Fatiha and continuing with the short suras at the end of the Book, the student learns the letters in the order in which they appear in the Qur'an. The verses are divided into their smallest elements, the letters, and the lessons consist of reciting each letter by its name: *"Ba, si, mi, alifu, lamu, lamu, ha."* Salifou recites the names of the letters which together form the very first word in the Qur'an: *Bismillah*, "In the name of God."

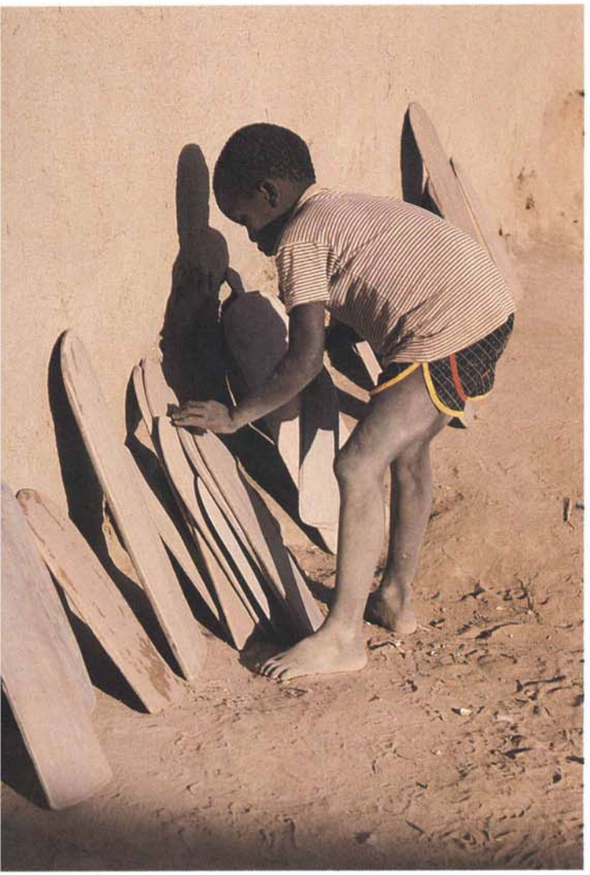
The alifu-alifu phase encompasses the first sura and the ten short, final ones (suras 105 through 114). The same part of the Qur'an is used in the next phase of education: *timiti-timiti*, a term derived from the Arabic verb *matta*, to stretch or draw out. Now, the marabout writes the letters with the vowel marks and other diacriticals that accompany them. The recitation of *Bismillah*, for example, runs as follows: *"Bi, si, mi, iye, la, hi."*

When a student has completed reading the 11 short suras in this fashion, he has encountered all the letters of the alphabet in combination with the different vowel marks and diacritical signs. This is not to say, however, that he has really learned the alphabet – he can simply rattle off the vocalized letters, just as they were recited by the marabout.

After the timiti-timiti phase, the student returns for the third time to the Qur'an's opening sura, to be taught to read the words of God properly. He is now a *tyo koray* – literally, "clean reading" – student. The writing on his board is the same as during the previous phase, but the recitation no longer consists of reading each letter separately. They are combined to make words. After a few lessons the student recites the two first verses of Sura al-Fatiha: *"Bismillahi rahmani rahimi. Al-hamdulillahi rabbi al-'alamina"* – "In the name of God, the Compassionate, the Merciful. Praise be to God, the Cherisher and Sustainer of the Worlds" – a combination of words which he does not yet understand, for the student's only concern, at this stage, is to recite them correctly. To the inhabitants of Djenné, as to all other West African people – except for a few Arabic-speaking desert tribes – Arabic is a foreign language. Even to speakers of colloquial Arabic, the seventh-century Makkan Arabic is not always immediately accessible.

Learning a few words or one phrase at a time, the tyo koray student reads the first sura. When he masters the correct recitation of Sura al-Fatiha, the marabout will write on his tablet the first verses of *Sura al-Nas* (The People), the 114th and final chapter of the Qur'an.

For the most part, the suras of the Qur'an are read in reverse order, with the shortest and most easily memorized suras first. The ultimate aim of the Qur'anic schools is to enable a student to recite the final verses of the second and longest sura, *al-Baqara* (The Cow), though only a minority ever reach this goal. Most students leave school before they have read the entire Book.

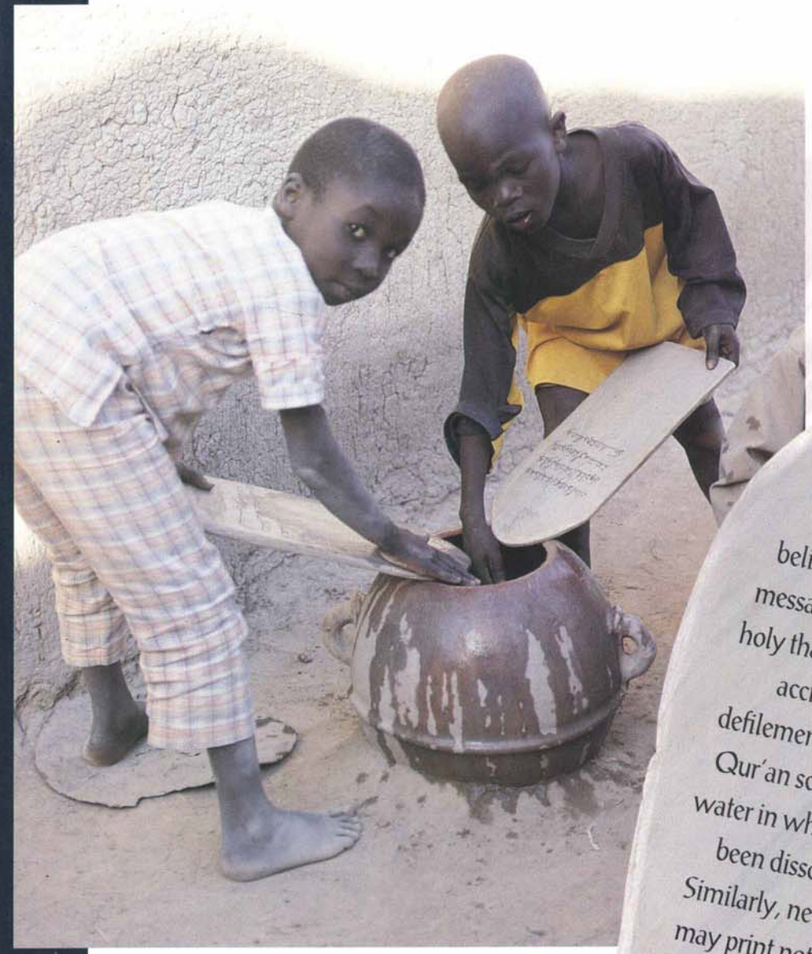


Freshly clay-coated boards are set out to dry.

Correctional methods may be harsh. The student who repeatedly makes errors in reciting, or one whose attention slackens and who does not practice his lessons ardently enough, can count on a smart touch from the marabout's quirt, or one wielded by an older student

When a student's lessons have been heard and he has recited his verses correctly, the teacher gives him permission to wash the text off his writing board. The water he uses to do this is collected in a pitcher, called a *nesi-kusu*, or holy-water jar, set aside for this purpose in the courtyard of the marabout's house. This is because everything that contains words from the Qur'an is considered holy and must be handled carefully – even the water in which the words of the Qur'an are dissolved. Once or twice a year, the nesi-kusu is emptied; the water, thick with ink and clay washed off the writing boards, is carried outside the town and poured into one of the branches of the river Bani. Even the water with which the pitcher is rinsed out must be discarded there. One marabout, who grew up in the countryside near Djenné, explained that in the villages students wash their writing boards at the spot where the fire is lit at night, "because nobody ever walks on that spot," and the holy words, dissolved in water though they be, will not be defiled by human feet.

The reading phase of primary Qur'anic education in Djenné continues up to Sura 67, *al-Mulk* (Kingship). From this point on, the student is simultaneously taught how to read the words of the Qur'an and how to write them. The marabout scratches the verses into the thin coating of clay on the writing tablet with a pointed piece of wood. The student meticulously follows these marks on his board with a pen, filling them in with ink, and shows his tablet to the teacher when he is finished. The marabout reads the passages aloud, corrects the writing, returns the tablet to his pupil and reads the text to him word for word. The student, following what he has written with his finger, repeats the words after the teacher, then sits down and works on the correct recitation of the verses on his tablet. When in doubt, he consults a fellow student or the master, and asks him to repeat a particular passage. This phase is called *khairun* (from the Arabic *khair*, meaning good, a good thing, a blessing). During the next phase, *khairun kasida*, which embraces Suras 36 to 46, the marabout leaves more space between the lines he scratches on the board. The student no longer traces the script the teacher has written but writes out his own script below the master's example.



Students wash clay and ink from their boards into a jar; the water will later be carefully disposed of.

Many Muslims believe that the name of God, and His message as recorded in the Qur'an, are so holy that they must be protected even from accidental or indirect disrespect or defilement. This explains the concern of the Qur'an scholars in this article that the very water in which the ink of the holy words has been dissolved be disposed of properly. Similarly, newspapers in Muslim countries may print notices, like this one, urging their readers to avoid disrespectful secondary uses of their pages – such as wrapping garbage or cleaning shoes – since the name of God or a quotation from the Qur'an may be printed on them.

Copy-boards held safely out of view on their heads, students recite a Qur'an passage from memory.

At the end of the khairun kasida phase, during which he has copied his master's script,the student has read one-quarter of the Qur'an. The remaining suras he will read after he has written them all by himself, copying them from single pages of loose-leaf copies of the Qur'an. Before this *fita* (leaf) phase, students are considered too immature to handle the Qur'an with proper respect.

When the fita student has written his lesson, he shows it to the marabout for correction. And after having heard from his teacher how to recite the verses, he practices the proper recitation by himself. The fita phase includes most of the Qur'an and ends with the final verses of Sura al-Baqara.

Studying in this manner, a student needs at least four years to finish the Qur'an – though individual differences are substantial. When he has learned the final verses of the second sura, a ceremony (*alkorana dyumandi*) is held: Other Qur'an teachers of Djenné are invited to the school to witness how the student, repeating the words after his master, recites the last part of the second sura twice over. A visiting marabout delivers benedictions and all present partake of a meal prepared by the student's family. Together with a few schoolmates, the student walks about town displaying his writing tablet and collecting the tribute of respect: small gifts of rice, millet, peanuts or a coin. The boy's father shows his gratitude for his son's education by donating a sum of money to the teacher.

Besides this "final payment," which may vary from 5000 to 20,000 francs CFA ($17 to $70 or £28 to £40), the teacher is also paid about 500 francs when the student reaches the halfway point of his studies at Sura 19 – in addition to regular payments each Wednesday, when the students bring a fee of 10 or 25 francs CFA to school.

However, a student's Qur'anic education does not necessarily end when he has read the entire Book. He may continue his studies, either moving on to the secondary level or remaining at the elementary school and rereading the Qur'an. In the latter case, with the final ceremony postponed, the student begins to write and read the entire Qur'an again from the first sura onward. Some try, at the same time, to learn the text by heart.

All this is of no concern yet to young Salifou: His Qur'anic education has only just begun. But he is proud to be among the older children now, and he keeps practicing the recitation as the marabout showed him: *"Ba, si, mi, alifu, lamu, lamu, ha...."* After a few months he will combine these letters in the holy phrases of one of Islam's central and most beautiful prayers – words he will recite and read all his life: "In the name of God, the Compassionate, the Merciful. Praise be to God, the Cherisher and Sustainer of the Worlds; the Compassionate, the Merciful; Master of the Day of Judgment. Thee do we worship, and Thine aid do we seek. Show us the straight way: The way of those on whom Thou hast bestowed Thy Grace, those whose [portion] is not wrath, and who go not astray." ⊕

Geert Mommersteeg is an anthropologist attached to the Department of Cultural Anthropology at the University of Utrecht in The Netherlands.

Ferdowsi's "Fire Ordeal of Siyavush" by Aghamiri.

EVENTS & EXHIBITIONS

Dragons, Heroes & Lovers: *Revival of Manuscript Painting Traditions in Uzbekistan and Iran* features the work of two living master-artists, Shah Mahmud Muhamedjanov of Tashkent and Mohammad Bagher Aghamiri of Tehran. Drawing on themes from classical Persian literature, both have revived painting techniques forgotten in this century in their own societies. The two artists have illustrated such celebrated works as Ferdowsi's *Shah-nameh* and Nezami's *Quintet (Khamseh)*. Muhamedjanov, a manuscript-painting restoration specialist for the Uzbek Academy of Sciences, paints in the miniature style and technique favored by the Timurid royal workshops of the 15th century. Aghamiri, a professor of miniature painting and manuscript illumination on two Tehran faculties, is known for technical brilliance in his artistic work, not only with figural scenes but also with his lavishly illuminated borders. Wing Luke Asian Museum, **Seattle**, through October 20, 1991.

The Art of Asia: *Chinese, Indian and Islamic Painting and Calligraphy*. The Islamic sector of this new installation features the written word, the highest art form in the Islamic world, and small elegant paintings from books and art albums. **Cincinnati [Ohio]** Art Museum, through September 15, 1991.

Artful Deception: *The Craft of the Forger*. The fascinating stories behind two dozen fakes from The Walters Art Gallery's permanent collection, including three from the Middle East. Elvehjem Museum of Art, University of Wisconsin, **Madison**, September 15 through November 10, 1991; Rochester Memorial Gallery, University of **Rochester, New York**, December 1, 1991, through February 2, 1992; Barnum Museum, **Bridgeport, Connecticut**, March 1 through July 19, 1992.

Forty Indian Paintings from the Collection of Howard Hodgkin. Paintings and drawings on loan from an eminent English painter depict village and court life in the Subcontinent's three major regional styles: Rajput, Deccani and Mogul. Sackler Gallery, **Washington, D.C.,** September 15, 1991, through January 12, 1992.

Islamic Art and Patronage: *Selections from Kuwait*. More than 100 Islamic masterworks of the eighth to 18th centuries from one of the world's leading private collections. Emory University Museum of Art & Archeology, **Atlanta, Georgia**, through September 22, 1991; Virginia Museum of Fine Arts, **Richmond,** November 5, 1991 through January 19, 1992; **St. Louis [Missouri]** Museum of Art, February 15 through April 12, 1992.

The Here and the Hereafter: *Images of Paradise in Islamic Art*. This exhibition demonstrates the cultural importance of the Islamic vision of the afterlife. Bowdoin College Museum of Art, **Brunswick, Maine**, September 26 through December 5, 1991; University Art Museum, **Berkeley, California**, January 22 through March 29, 1992.

The Sculpture of Indonesia features 135 masterpieces from the classical eighth to 15th centuries of the world's most populous Muslim country. Asian Art Museum of **San Francisco**, September28, 1991, through January 5, 1992.

Sifting the Sands of Time: *The Oriental Institute and the Ancient Near East* traces the history of Chicago's Oriental Institute in the forefront of ancient Near Eastern research and scholarship. University of **Chicago**'s Oriental Institute Museum, October 6, 1991, through December 31, 1992.

Utilitarian Weavings: *Asian Steppes to the Altiplano*. The Textile Museum's 15th Rug Convention will focus on Eastern- and Western- Hemisphere weaving traditions. Experts look at the Middle East's functional nomadic textile tradition – especially bags, nomadic trappings, red screens and felt – as well as utilitarian weaving of Mexico, Bolivia and the Andes. The Textile Museum, **Washington, D.C.**, October 11 through 13, 1991.

The Afghan Folio. Luke Powell's compelling photographs of Afghanistan in the 1970's displayed as dye-transfer prints. **Pensacola [Florida]** Junior College Visual Arts Gallery, October 12 through November 10, 1991; **Parkersburg [West Virginia]** Art Center, October 19 through December 1, 1991; Sarah Lawrence College Art Gallery, **Bronxville, New York**, October 21 through December 20, 1991.

Yemen: *A Culture of Builders* takes an artistic look at Yemeni architecture. University of New Mexico School of Architecture & Planning, **Albuquerque**, through October 18, 1991; Ball State University College of Architecture & Planning, **Muncie [Indiana]**, November 4 through December 13, 1991.

Court Arts of Indonesia. Some 160 works of art reflect the 1000-year traditions of the royal courts of Indonesia. Natural History Museum of **Los Angeles** County, October 19, 1991, through January 5, 1992.

The Sigmund Freud Antiquities: *Fragments from a Buried Past*. On display are 65 Greek, Etruscan, Roman, Egyptian and Asian artifacts from the Freud collection in London. University of **Houston**'s Sarah Campbell Blaffer Gallery, through October 20, 1991; Jewish Museum, **New York**, November 7, 1991, through February 18, 1992; **Boston** University Art Gallery, February 26 through April 6, 1992.

Twilight of the Pharaohs: *The Rebirth of Ancient Egypt*. A scenographic presentation of the history and development of Egyptology. Ägyptisches Museum, **Berlin**, through October 20, 1991.

Palestinian Costume. Richly ornamented traditional costumes, headdresses and jewelry of Palestinian villagers and Bedouins. Museum of Mankind, **London**, through October 1991.

Arms and Armor Galleries Reopening. The first major face-lift in 30 years for the Metropolitan Museum of Art's permanent arms and armor collection, featuring about 1000 objects of Islamic, European, American and Japanese origin. Metropolitan Museum of Art, **New York**, from November 1, 1991 (postponed from May 11, 1991).

Jordan: *Treasures from an Ancient Land*. The first-ever exhibition in the United Kingdom of the art and archeology of Jordan, this presentation brings together more than 600 objects from top international collections. **Liverpool** Museum, through November 3, 1991.

The Arts of the Persian World: *The A. Soudavar Collection*. Some 100 works trace the evolution of Persian art. Highlights include a rich selection of paintings from the Safavid period (1501-1736). **Los Angeles** County Museum of Art, through November 10, 1991.

Crushed Lapis and Burnished Gold: *The Art of Illumination* explores the embellishment of manuscript pages with designs in brilliant gold, lapis lazuli and other vibrant colors, an integral part of Muslim book production since the ninth century. Sackler Gallery, **Washington, D.C.,** through December 8, 1991.

Gold of Africa: *Jewelry and Ornaments from Ghana, Côte d'Ivoire, Mali and Senegal*. More than 150 spectacular objects are evidence of highly developed skills and tastes in the West Africa of the 19th and 20th centuries. **Detroit [Michigan]** Institute of Arts, December 15, 1991,through February 9, 1992; **Indianapolis [Indiana]** Museum of Art, March 8 through May 3, 1992.

Armenian Art: *3000 Years of History*. A panoramic look at the artistic achievements of the Armenian people. The Armenian Museum, **Paris,** Thursdays and Sundays through 1991.

Silk: *Legend, Power and Reality*. This exhibition, a Spanish contribution to UNESCO's "Silk Roads, Roads of Dialogue" program, acknowledges the important role of the Arabs in introducing silk to Western Europe via Andalusia in Spain. Museu Tèxtil, **Terrassa, Spain**, through December 31, 1991.

Vanished Kingdoms of the Nile: *The Rediscovery of Ancient Nubia* covers 4000 years of Nubian history and features decorated pottery, metalwork, jewelry and basketry. University of **Chicago**'s Oriental Institute Museum, February 3 through December 31, 1992.

Beyond the Pyramids: *Geometry and Design in the Carpets of Egypt, 1450-1750*. The Textile Museum's unparalleled but rarely seen collection of classical Egyptian carpets is featured in an exhibition on aspects of geometry and design in the Mamluk and Ottoman periods. The Textile Museum, **Washington, D.C.,** through February 16, 1992.

An Old Turkish House. Visitors to the Textile Museum can experience the ambience of a late Ottoman house in 18th/19th-century Istanbul. The Textile Museum, **Washington, D.C.,** through February 16, 1992.

When Kingship Descended From Heaven: *Masterpieces of Mesopotamian Art From the Louvre*. Some of the most renowned artworks from ancient Sumer and Akkad are featured in this loan exhibition. Sackler Gallery, **Washington, D.C.**, from March 8 to late Summer 1992.

Pre-Islamic Arabia. A preview of pre-Islamic antiquities to be exhibited later at the Louvre. Featured are pre-Islamic artworks from Yemen, alabaster sculptures, portraits from Palmyra, Imru al-Qays epitaphs, ceramics, etc. Institut du Monde Arabe, **Paris**, until 1993.

Nomads and Nobility: *Art From the Ancient Near East*. Spectacular artifacts from the pre-Islamic Middle East. Sackler Gallery, **Washington, D.C.**, continuing indefinitely.

Three New Permanent Galleries at the British Museum contain numerous objects of interest from the ancient Middle East: The Wolfson Gallery of Roman Antiquities (Rome: City and Empire) and the Raymond and Beverly Sackler Galleries of Early Mesopotamia and of Egypt and Africa. The Wolfson opened on June 27 and the Sackler Galleries on July 18, 1991. The British Museum, **London**.

The Aramco Exhibit. Centered on the Arab-Islamic technical heritage, this permanent interactive, "learn-by-doing" scientific exhibit relates the historical background to today's petroleum exploration, production and transportation. **Dhahran, Saudi Arabia.**

Information is correct at press time, but please reconfirm dates and times before traveling. Readers are welcome to submit information for possible inclusion in this listing.

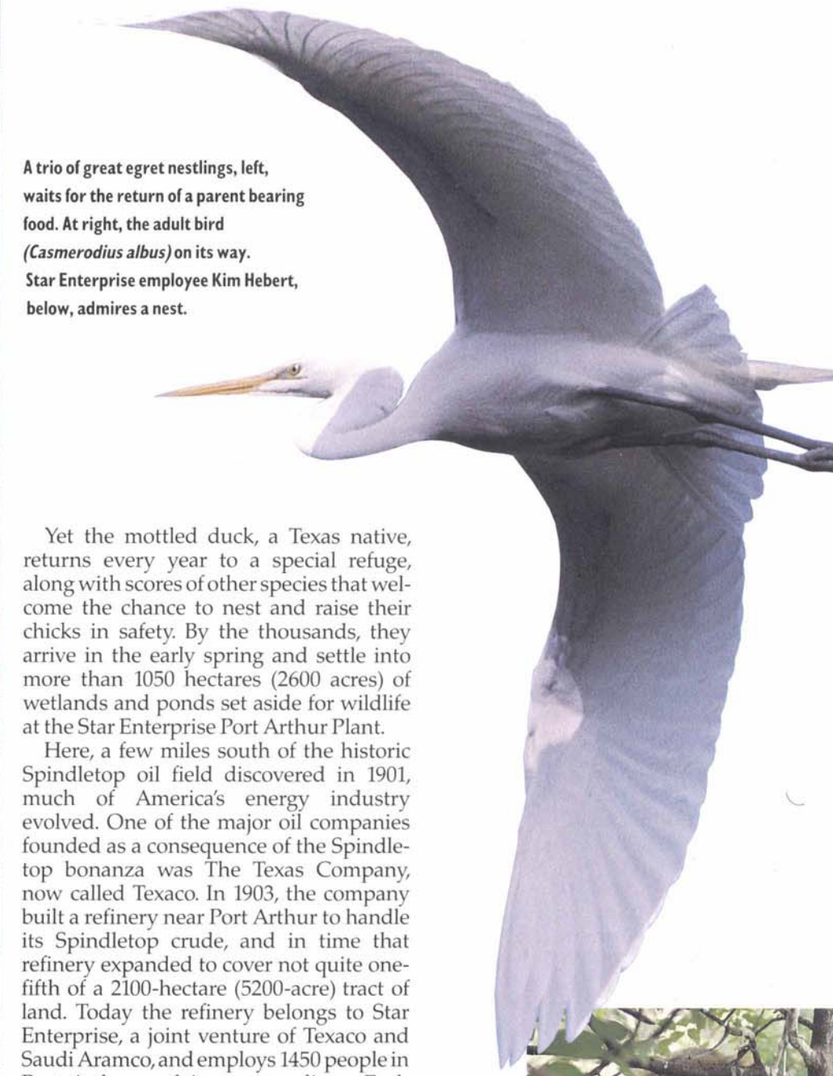
From the midair vantage point of a mottled duck, the coastal plain of southeast Texas must seem intimidating. In Jefferson County alone, no fewer than four oil refineries and 21 chemical factories sprawl across the land. Port facilities, canals, oil and gas fields, pipelines – all the vast infrastructure of the petroleum industry – occupy much of what, at the turn of the century, was prime habitat for water and shore birds.

Port Arthur Plant occupies less than a fifth of its 5200-acre tract.

SAFE HAVEN FOR BIRDS

WRITTEN BY DOWNS MATTHEWS
PHOTOGRAPHED BY DAN GURAVICH

A trio of great egret nestlings, left, waits for the return of a parent bearing food. At right, the adult bird *(Casmerodius albus)* on its way. Star Enterprise employee Kim Hebert, below, admires a nest.



Yet the mottled duck, a Texas native, returns every year to a special refuge, along with scores of other species that welcome the chance to nest and raise their chicks in safety. By the thousands, they arrive in the early spring and settle into more than 1050 hectares (2600 acres) of wetlands and ponds set aside for wildlife at the Star Enterprise Port Arthur Plant.

Here, a few miles south of the historic Spindletop oil field discovered in 1901, much of America's energy industry evolved. One of the major oil companies founded as a consequence of the Spindletop bonanza was The Texas Company, now called Texaco. In 1903, the company built a refinery near Port Arthur to handle its Spindletop crude, and in time that refinery expanded to cover not quite one-fifth of a 2100-hectare (5200-acre) tract of land. Today the refinery belongs to Star Enterprise, a joint venture of Texaco and Saudi Aramco, and employs 1450 people in Port Arthur and its surroundings. Each day, they convert 250,000 barrels of oil (one barrel equals 159 liters or 42 US gallons) into fuels and lubricants to be used by American motorists.

Yet not far from their distillation towers and storage tanks, Star Enterprise specialists also maintain a very different kind of "plant": important marsh and bayou habitats that serve as safe havens for birds and other wildlife.

"We consider ourselves and our company as environmental stewards," emphasizes Ron Korbini, environmental supervisor for the Star Enterprise Port Arthur Plant. "We are committed not only to the

Roseate spoonbills *(Ajaia ajaja)* catch small fish and crustaceans by sweeping their bills sideways along the bottom of shallow waters. Fledgling cattle egret *(Bubulcus ibis)*, opposite, will be fed insects by its parents.

White-tailed deer and alligators (opposite) also inhabit the Star Enterprise land.

conservation of natural resources but to their enhancement. That's our initiative for the nineties."

Rebecca Demeter, a senior project chemist in the Environmental Health and Safety Division, takes the lead as wildlife preservation coordinator for the plant. Her efforts to improve bird habitat on the wetlands and watercourses surrounding the refinery have proved irresistible to many species of birds. Spring visitors routinely include mottled duck, black-bellied whistling duck, blue- and green-winged teal, great egrets, snowy egrets, roseate spoonbills, black-crowned night herons, Louisiana (tricolored) herons, olivaceous cormorants, little blue herons, white ibis and more. Many have relocated here from other coastal areas, where loss of habitat to human needs and an excess of predators threaten bird populations.

Around the Port Arthur Plant in spring, however, bird families bend the limbs of sugarberry and black willow trees that arch above the steep banks of Alligator Bayou. Great and snowy egrets gleam whitely among the dark leaves like fragments of fallen full moons. Roseate spoonbills in peignoirs of shocking pink balance in the treetops and quarrel over domestic matters. Olivaceous cormorants greet their mates with bullfrog croaks. Black-crowned night herons sit stolidly in their chosen trees, looking like deacons in church – but the egrets watch them warily, for night herons sometimes prey on the eggs and chicks of other species.

In the treetops, the wallflowers sit, hoping to attract avian swains. A male great egret glides down the watery avenue of the bayou and arrives at the receiving line of waiting females with a twig in his beak that seems suitable for nest-building. He offers it to a comely female, who, by accepting it, also accepts him as a mate. She adds the twig to an existing nest built up by generations of egrets.

Among the nesters, the turf wars are shrill and continuous. An egret sitting on a clutch of sky-blue eggs defends her territory from encroachment with warning squawks. A claimant who persists is repelled by blows from the owner's wings and jabs from her dagger-sharp beak.

More than 7000 pairs of birds nest in the mature forest that lines this stretch of Alligator Bayou and its adjacent ponds. Dollops of guano whiten and fertilize the bayou's warm, green waters as they meander slowly toward the Gulf of Mexico.

Each tree wears a messy garnish of nests constructed of twigs and leaves. Eggs fill some of them; from others, chicks peer wide-eyed and fright-wigged at the world.

His two-hour shift on the nest over, an off-duty snowy egret parent sits in the sun and preens the gossamer tresses of his breeding plumage. These lacy, graceful feathers almost led to the extinction of the species during the 19th century, when plume hunters killed egrets by the thousands to supply feathers to the ladies' millinery trade. Now protected from hunting, egrets are endangered chiefly by loss of habitat and a dwindling supply of prey species such as frogs.

Along the bayou bank, where sweet honeysuckle blossoms offset the sour smell of bird droppings, a female snowy egret hunts food for her chicks. In the shallows, she plants her golden feet with care and waits motionless as a school of minnows swims downstream. Foraging for mosquito larvae, the little fishes fail to notice the glittering black eye that watches them. The sharp black beak stabs downward with deadly precision and claps shut on a wriggling darter.

Rising on broad, slow-stroking wings, the egret returns to her nest. As she descends in a flurry of feathers, her fuzzy chicks gape avidly and struggle to be first in line at the cafeteria. One overeager nestling clambers out of the nest onto the supporting branch, then loses its grip and topples into Alligator Bayou. A pair of yellow eyes promptly surfaces upstream, and at the apex of a V-shaped wake, an alligator moves quietly toward the struggling infant. Its jaws open briefly, casually, and the hapless bird disappears without a sound. Yet nesting birds are in greater danger from such predators as raccoons, opossums, feral dogs and cats, and human vandals than from alligators.

To give nesting birds the protection and privacy they require in rearing their chicks, refinery personnel keep watch to prevent human harassment or poaching. Any unauthorized visitor will immediately be challenged by a refiner concerned for the welfare of "his" birds. Another program of trapping and removal seeks to discourage animal predators that sometimes prowl the rookery.

Louisiana heron *(Hydranassa tricolor)* flies in typical position, with head held back against the body and legs trailing. The species ranges into Central and South America. Opposite, great egret "moon fragments" in a rookery tree, and a nest of newly-hatched spoonbills.

Marsh rabbit's notched ear may indicate a close call in the past.

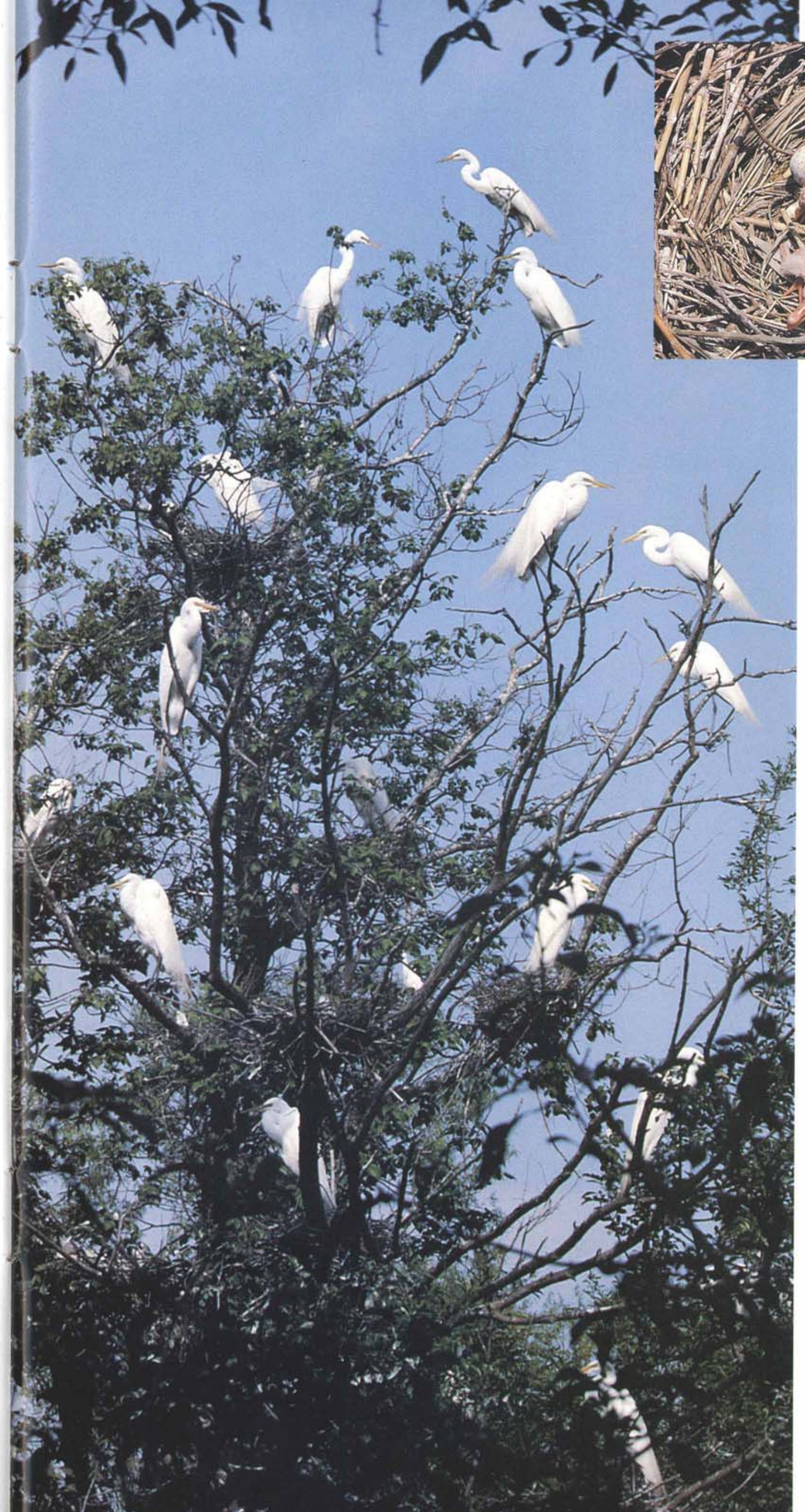
Port Arthur citizens likewise have been encouraged to become environmental partners through Star Enterprise programs in civic clubs and schools that emphasize the need to protect wildlife. As adults and children alike become more aware of their environment, wild birds gain a constituency of concerned people: humans willing to take an active interest in their welfare. As a result, bird populations that were once declining along the Texas coast have now stabilized in the Port Arthur area.

Jim E. Neaville, wildlife biologist with the US Fish and Wildlife Service's Anahuac National Wildlife Refuge, praises Star Enterprise's efforts to encourage wildlife. Other companies should introduce similar programs, he believes.

"They've got all the elements in place here," he says, "and they are making all the right moves for the right reasons."

Earlier demands saw industry learn to live with wildlife populations instead of driving them away, Neaville says.

"In the nineties, I think we will find more companies undertaking proactive programs like this one to encourage the return of wildlife as a valuable natural asset," he says. "Star Enterprise is exercising leadership in showing them how."



Central to the success of the refuge is the refinery's 160-hectare (400-acre) system of water reservoirs. While providing process water to the refinery, these small lakes also support ducks, cormorants and other diving birds.

To preserve water quality, Star Enterprise built a drainage and canal system for capturing and diverting rainwater falling on plant grounds. It is segregated from process water – used as a coolant in the refining process – to eliminate the chance of contamination. The goal: to make sure that only clean water, safe for birds and their habitats, flows into the wetlands and bayous of the refuge.

To further encourage birds, Star Enterprise is creating crawfish ponds where crude oil storage tanks once stood. A larger food supply would attract some of the 12,000 pairs of birds that are now crowding into another wildlife refuge nearby, Neaville believes.

Environmental managers at Star Enterprise plan to enhance the marshy areas of the refuge by maintaining water levels and encouraging the growth of types of vegetation preferred by birds. A landfill soon to be capped with topsoil will get a planting of millet, which many birds find tasty. Other parts of the refinery grounds will be planted in red clover, something mottled ducks prefer. In time, plantings of wildflowers and evergreens will provide cover and food for ground-nesting birds such as mottled ducks and black-bellied whistling ducks.

Their presence helps Star Enterprise prove that environmental and economic values can coexist, given the concern and the right kind of planning.

"As an industry, we plan the extraction of natural resources and their conversion into useful products," Ron Korbini says. "It's logical for us to plan for environmental conservation, as well. We see ourselves as stewards of the natural world."

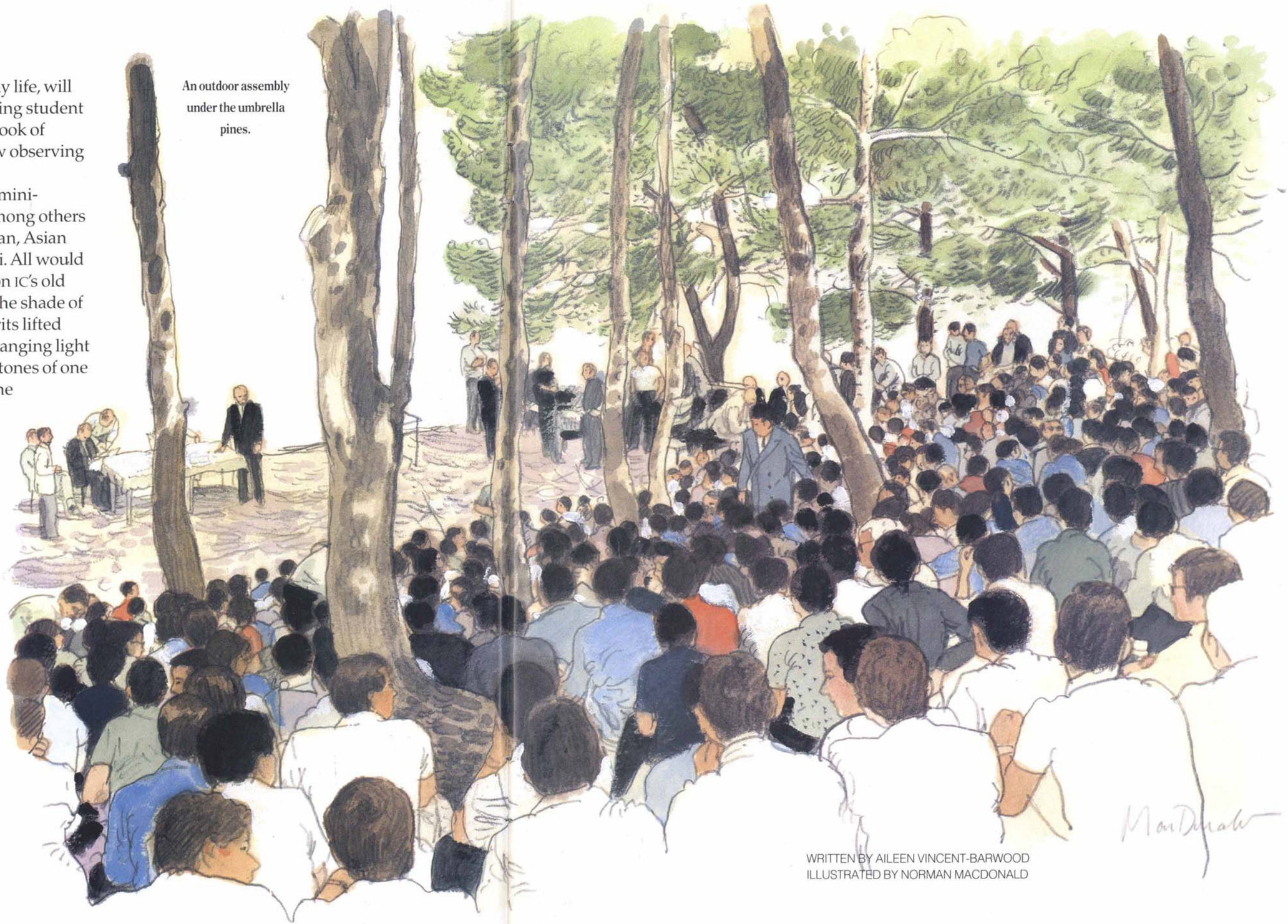
Free-lance writer and author Downs Matthews, a native Texan, specializes in wildlife subjects.

"Fifteen years at IC, the festival of my life, will always be with me," writes graduating student Sana Haydar in a letter to the yearbook of International College in Beirut, now observing its hundredth anniversary.

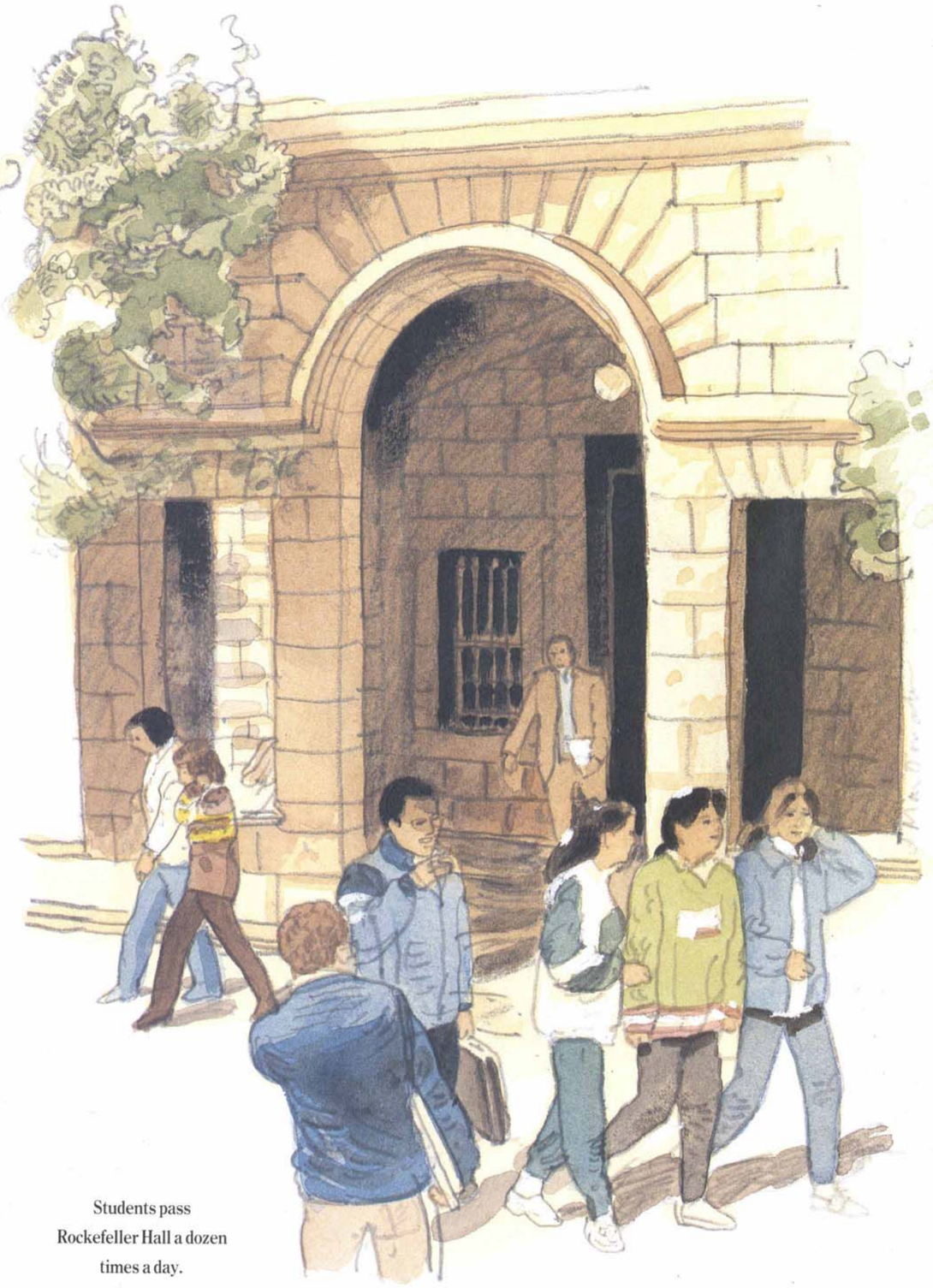
Celebrating the event at various mini-reunions around the world are – among others – Arab, Armenian, Turkish, European, Asian and American alumnae and alumni. All would probably have preferred to gather on IC's old campus in Beirut, to walk again in the shade of its generous trees, to have their spirits lifted once more by the richness of the changing light on the red roofs and sun-warmed stones of one of the finest secondary schools in the Arab world.

A Century of Service

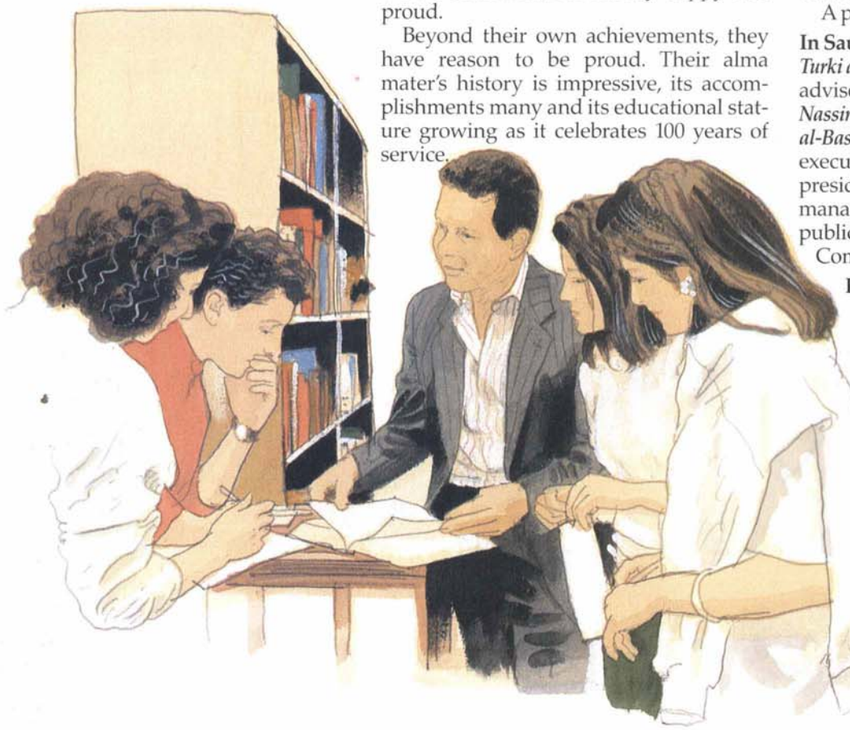
An outdoor assembly under the umbrella pines.



WRITTEN BY AILEEN VINCENT-BARWOOD
ILLUSTRATED BY NORMAN MACDONALD



Students pass Rockefeller Hall a dozen times a day.



Teaching and learning also take place outside the classrooms.

But because of the Gulf war and the insufficiently settled situation in Lebanon, a grand reunion in Beirut this year was not to be. Former students have had to settle for regional get-togethers, fond reminiscences about their years at IC, and quiet acknowledgement of their common pride in an institution that has, over the last century, made an indelible imprint on the Middle East.

The 1990 edition of *The Torch*, the yearbook that printed Sana Haydar's letter, is dedicated "To Beirut: The City That Will Never Surrender." The same could be said about IC itself.

The Torch's photographs, captioned in English and Arabic, are ageless. Clothes and hair styles have changed, customs and behavior grown more open, but the photos show kids in universal poses: jeans-clad figures mugging for the camera or enjoying field trips to the Bekaa Valley, crowning "Miss Torch 1990," putting on plays, editing the yearbook, scouting, clowning at parties, and playing on the IC football field. As always, the year's graduates look attractive, slightly apprehensive, a little sorrowful, but mostly happy and proud.

Beyond their own achievements, they have reason to be proud. Their alma mater's history is impressive, its accomplishments many and its educational stature growing as it celebrates 100 years of service.

More than 90 percent of IC's graduates have gone on to university studies. Many now fill faculty and administrative posts in schools throughout Europe, North America and the Middle East. IC's outreach program, the Educational Resources Center (ERC), has aided education in Africa and throughout the Arab world.

For a school of its size – a total of 3147 students from kindergarten through secondary level at last count, with a full-time faculty of 173 and 29 part-time teachers – IC's roster of illustrious alumni and their achievements is remarkable. Among its former male and female students are prime ministers, cabinet members, members of parliament and ambassadors to the United Nations, the Council of Europe and numerous countries. They include leaders in the worlds of education, business, health and the national and international civil service, as well as inventors, architects, agriculturalists, musicians, painters, writers, poets and philanthropists. Though most live and work in their Middle Eastern homelands, many have carried their IC experiences throughout the world.

A partial listing of alumni includes:

In Saudi Arabia: ***Princes Fahd, Faisal*** and ***Turki al Sudairy; Muhammad al Sulaiman,*** an adviser in the royal cabinet; ***Ali Naimi, Nassir Ajmi, Abdullah al-Ghanim*** and ***Faysal al-Bassam,*** respectively president and CEO, executive vice president, senior vice president for engineering and project management and vice president for public affairs of the Saudi Arabian Oil Company (Saudi Aramco);

In Bahrain: Foreign Minister ***Muhammad ibn Mubarak Al-Khalifah,*** Education Minister ***Ali M. Fakhro*** and Planning Minister ***Yusuf Shirawi,*** as well as ***Abdullah Kanoo,*** chief executive officer of Yusuf Al Kanoo Company, and business executive ***Muhammad Khalifat***;

In Qatar: Director General of Customs ***Ahmad Othman Fakhro***;

In Lebanon: former Prime Ministers ***Selim el-Hoss*** and ***Saeb Salam,*** Education Minister ***Najeeb Abu-Haydar,*** Arab Banking Association President ***Anwar el-Khalil,*** and former Minister of Public Works ***Walid Jumblatt.***

IC's 12,000 international alumni – its "extended family," as they like to be known – are represented in positions of leadership on every continent but Antarctica. They pride themselves on being graduates of a school of such reputation that, very often, they can refer to it anywhere in the world simply as "The IC" and find that someone within earshot either knows the school, has been there or is a graduate.

Many undoubtedly share the feeling of Lebanese-born Fouad Ajami, director of Middle East studies at Johns Hopkins University's School for Advanced International Studies and author of *The Arab Predicament*. Ajami writes, "If I have gone anywhere academically in my life today it was the gift of that school that enabled me to do so.... The excellence of the place and the freedom...enabled me to see that there was a world beyond Lebanon.... I can write you volumes about the men and women who taught me there, about the world of books and discipline and devotion that that school opened up for me...."

"For me," wrote historian Hisham Sharabi of Georgetown University, former director of the Center for Contemporary Middle East Studies and chairman of the Jerusalem Fund, "the most important influences were three: First,... IC gave me the means to decide the areas and disciplines most suited to my interest and temperament.... Second, at IC I was provided with the mental tools and basic orientations for independence of judgment.... Third, life at IC was the avenue for many friendships that have ever since been central in my life."

So strong are such ties, so great the affection, that IC graduates with children of their own, forced to flee Lebanon because of the civil war, set up a school in London modeled on their alma mater so that their children would not miss the school's special brand of student-centered education.

Today's emphasis, says IC President Gerrit Keator, is what the school's mission has always been: to teach students the basic values that draw all peoples and religions together.

"That's the one thing that will make all their academic knowledge work," Keator says, adding, "If our students were not imbued with self-confidence and the spirit to serve others, IC would be no different from a host of other schools. But it is different. We do book work as competently as any school anywhere in the world, but along with it we give a good grounding in self-worth and independent thinking. We also teach a value structure that will serve our students throughout their lives."

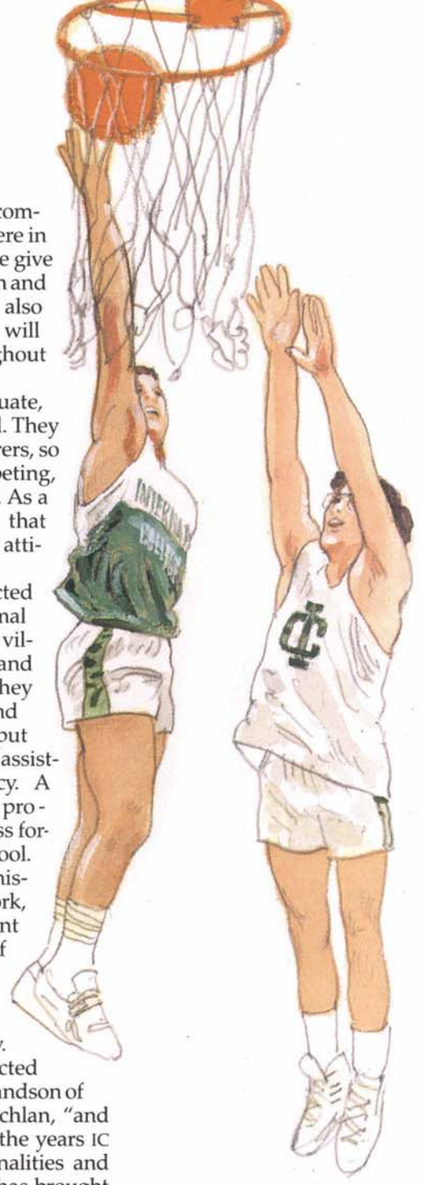
"At IC," says one graduate, "teachers are highly respected. They are coaches, rather than lecturers, so the kids aren't always competing, but learn to help one another. As a result, we learned early on that helping others is an important attitude to life."

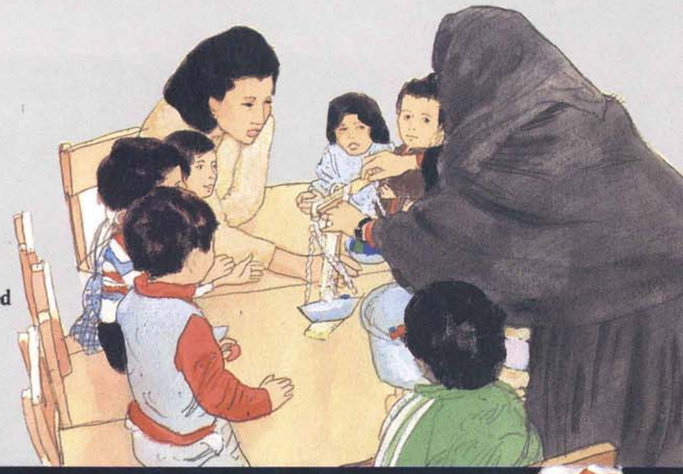
This attitude has also affected Lebanon in indirect, informal ways. Students go out to the villages to offer free tutoring and help to the handicapped. They collect money to buy food and clothing for needy villagers, put on shows for them, and offer assistance in times of emergency. A $50,000 scholarship and loan program has helped nearly 250 less fortunate students attend the school.

Says Katy Gorab, IC's administrative assistant in New York, "We have never sent a student away because of a lack of money."

At IC, students of different cultures and nationalities learn to live in harmony. "Everyone has always respected this," says Howard A. Reed, grandson of IC founder Alexander MacLachlan, "and the result has been that over the years IC has educated so many nationalities and religions in a way of life that has brought East and West together, that many in the Arab world find it hard to imagine."

Reed, professor emeritus of Middle Eastern and Islamic history at the University of Connecticut, has written a history of IC and his family's four-generational connection to it. He remembers his maternal grandfather MacLachlan – originally a hardworking Scottish-Canadian farmer from Chatham, Ontario – as a big man, keenly athletic, and motivated by service to others. Though he was a missionary, Reed says, his grandfather was first a teacher who wanted people to realize their full potential in their own faith.





The ERC: *Reaching Out*

Because of the demand that the school's success created for an IC-style education, International College's Board of Trustees decided in 1971 to make the school's experience andresources available to other Middle Eastern institutions. Thus was created the Education Resources Center (ERC), whose mission is to assist governments, international agencies and private groups in the Middle East with their primary and secondary educational projects.

President Keator sees ERC as a wellspring for IC's own and other teachers throughout the Arab world – "a library of theory and experience for the teacher as student, who will learn his or her lessons from the student as teacher."

In Lebanon, Oman and Kuwait, in Syria, Jordan, the UK and the United Arab Emirates (UAE), and from Greece to Nigeria, Iraq to Yemen, IC's core of faculty and administration consultants spread out year-round. Through their varied specializations, skills and backgrounds, they provide hands-on assistance that ranges from demonstrating management techniques, training teachers, developing curricula and evaluating programs to actually building schools.

In Yemen, ERC worked with the United Nations Children's Fund (UNICEF) to provide a child-care center. In Bahrain, it helped set up a model school, in Saudi Arabia an early-childhood teacher-training center. In Sharjah, UAE, the Al-Qasimia International School, now in its second year, has 250 students. Like all ERC-sponsored schools – which pay a fee to be affiliated with IC – the Al-Qasimia School has access to IC's specialists from other educational institutions, both within and outside Lebanon, and to other professionals in architecture, design and printing.

In Oman, in 1974, Sultan Qaboos asked ERC to establish a coeducational boarding school of the highest quality where students, Omanis as well as those from other Arab countries, could develop into leaders. He wanted, he said, students who were ethical, self-reliant and versatile, and who would have an international perspective. In a complete turn-key operation, ERC planned, equipped, staffed and supervised the school, which opened in 1977 in Seeb, Oman.

In Lebanon itself, ERC has provided professional help to 10 schools. In the village of Kfar Falous, a new elementary- and secondary-school complex, housing the beginnings of a hospital and a university, is rising amid the hills above Sidon.

On the western side of the Bekaa Valley, the Educational Center of Omar Al-Mukhtar encompasses a kindergarten and an elementary school, and is planning intermediate and secondary levels, as well as vocational, social and recreational centers.

"ERC's prime concern is with the physical, mental and emotional growth of individual students," Keator says. "We want to see every child, from early childhood through college level, thrive and prosper."

The ERC has helped establish a child-care center in Yemen (above) and a boarding school in Oman.

In 1891, Alexander and Rose Blackler MacLachlan founded The American Boys School in Izmir – then Smyrna – Turkey. The school's original staff of five lived and worked in a rented house, conducting classes in English, French, history, geography, Bible studies, mathematics and science. They also did social work, aided war orphans in the 1920's, instructed non-students in manual skills and printing, and prepared local textbooks. They established the first electric lighting plant in the Ottoman Empire as well as the first seismograph, the first observatory, the first Boy Scout troop, and the first research center on Turkish history and culture.

On the sports front, the MacLachlans' small school, renamed The American High School for Boys in 1892, held the first interscholastic athletics field day in the Ottoman Empire the following year, an event that attracted 3000 to 4000 spectators and led to formation of the Smyrna Schools Athletic Association later that year and the broader Pan Ionian League in 1894. Historian Reed calls these events "a useful prelude" to the first modern Olympic Games at Athens in 1896.

In that year, the school became The American Collegiate Institute for Boys, and by the turn of the century, it was generally regarded as the leading university prep school in the Ottoman Empire. Incorporated into the American Board of Foreign Missions in 1902, it became the International College of Smyrna, Turkey. So advanced were its first 43 graduates in their studies that they were admitted to the Universities of Geneva and Chicago and to the Massachusetts Institute of Technology without examinations.

Throughout the next three decades of war, civil strife and rising Turkish nationalism, IC continued to graduate students and serve its host country in a multitude of ways. During World War I, staff and students helped feed and care for some 1200 needy people, and though many teachers and older students were mobilized and shortages of food, fuel and funds became acute, IC managed, at the close of the war, to feed and house 2000 disabled Allied prisoners of war awaiting exchange. Those who died were buried on campus. Among the soldiers who later, in appreciation, donated a silver cup to IC was author A.A. Milne, creator of Winnie the Pooh.

A future prime minister of Turkey, Adnan Menderes (front row, second from left), was a member of an IC-sponsored Scout troop.

Alexander MacLachlan

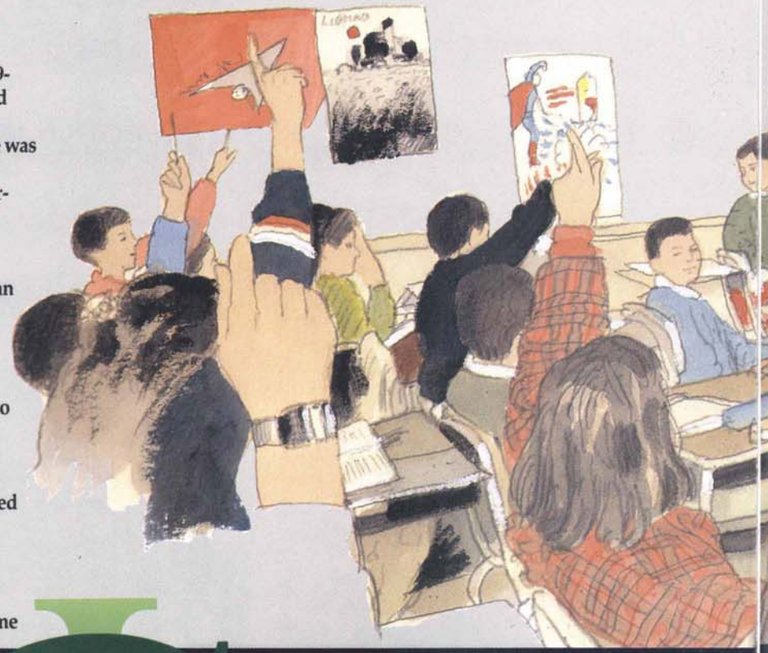
But in 1934, because of increasing government restrictions and protests against it as a foreign institution, IC decided to leave Turkey. The Board of Trustees accepted an invitation from Bayard Dodge, then president of the American University of Beirut, to move the school – lock, stock, name and resources – to Beirut, where it joined with AUB's "Prep" section. Its reputation for student-centered learning preceded it: In 1936, its first year of operation in Beirut, IC enrolled 900 students from over 30 countries. For five years it remained a part of AUB, then became an affiliate, and finally gained independent status in 1960. In 1957 it admitted its first girls to the secondary school, and in 1974 to the lower grades. (In 1973, IC celebrated the centennial of the old AUB prep section. See *Aramco World*, September-October 1973.)

Today's President Keator, a Yale graduate and former member of the Board of Trustees, administers two functioning campuses, one the original, shaded four-hectare (10-acre) campus in Ras Beirut that has five classroom buildings, three libraries, and an administrative building; the other, a two-building facility at Ain Aar in East Beirut that provides schooling for about 450 students. For security reasons, Keator has still not traveled to either campus since becoming president – though he did so earlier as a board member – and must operate from the offices of the parent Near East College Association in New York. But he is in close touch with both campuses and with IC Deputy President Edmond Tohme, an IC graduate and former lecturer at AUB, who has taught and administered at IC for over 20 years. Keator also travels frequently to the region to confer in person with teachers and administrators at meetings in nearby countries.

"The founder saw IC as a place that would provide the children and youth of the Middle East with a cross-cultural, international education, free of prejudice. We continue to do that," Keator says.

IC and the Lebanon Crisis

WRITTEN BY HOWARD A. REED



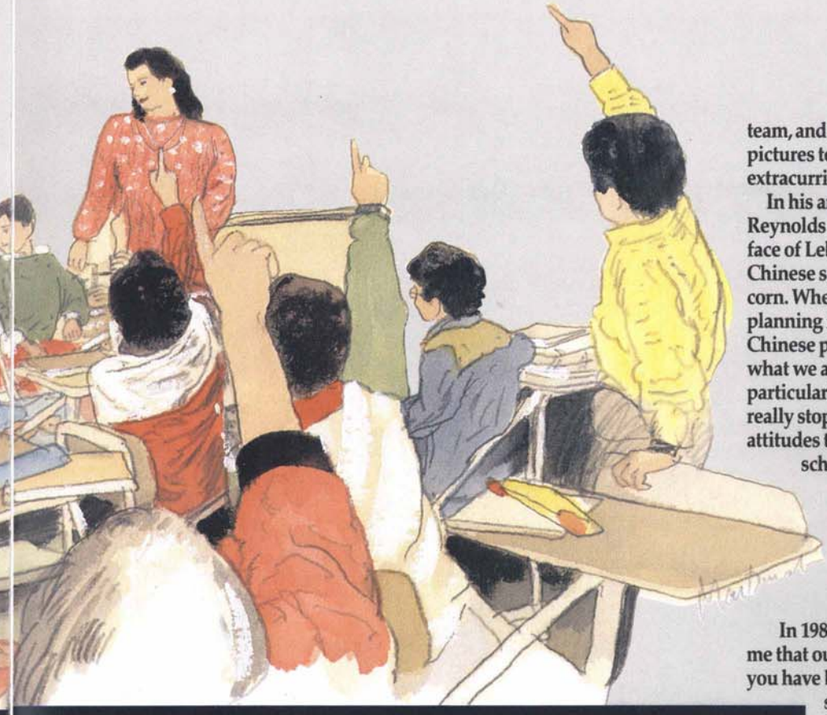
On October 21, 1971, a six-million-dollar, 69-hectare (170-acre) complex of arched and arcaded buildings designed by world-famous architect Edward Durell Stone was dedicated as IC's long-awaited second campus (See *Aramco World*, September-October 1973). The complex occupied a commanding hilltop near the village of Mechref, about 16 kilometers (10 miles) south of Beirut. Unfortunately, the onset of the Lebanese civil war less than four years later marked the beginning of the end of the ambitious project.

After April 1975, regular academic programs at the Mechref campus had to be abandoned because of the dangers and disruptions of the civil war. An IC presence, to provide at least token continuity and deter possible intrusions or looting, was maintained for several months by a few staff volunteers led by Thomas Weaver, head teacher of English, and historian Nimr Ibrahim, later joined by Maurice and Yvette Dumont, who lived nearby. But repeated occupations and threats by successive militias eventually forced even these intrepid IC veterans to withdraw.

As the civil war and external attacks continued, it became harder for teachers, staff and students from East Beirut to get to school at the main Ras Beirut campus in the western sector of the capital. Space was eventually rented from the neighboring American Community School to accommodate classes and house staff members unable to commute from their homes. Despite the city-wide bombing and shelling of 1976, which culminated in the bombing of the IC campus itself on July 4th, the school avoided any casualties that year and managed to graduate a large class of 246 students.

New IC President Alton Reynolds took effective charge of the school from about October 1976. By this time the civil war was exacting even greater sacrifices. The Lebanese crisis continued to escalate, taking on international dimensions by 1982. The widening of the conflict was another blow to IC's prolonged efforts to obtain urgently needed additional campus space – efforts which had again been on the verge of success. IC had purchased the small campus of the former British High School near the Beirut airport at Bishamoun. Building modifications had been made and an Olympic-sized swimming pool, donated by Elie A. Sehnaoui, a trustee and alumnus, was to have been formally inaugurated on the very day that the 1982 Israeli invasion of Lebanon began. (IC still owns, but as yet doesn't use, the Bishamoun campus.)

Reynolds and IC's resilient staff and students persevered against overwhelming odds to pursue their educational objectives. Year after year, the school proved it could provide a good education and graduate reasonably well-prepared students, despite disheartening crises, disruption and, eventually, even casualties. Students continued to produce plays, poems, and even a championship basketball team, and to publish the substantial *Torch* yearbook, full of pictures testifying to the ongoing academic and extracurricular life of IC.



In his annual letters to graduating seniors, President Reynolds revealed some of his thoughts and hopes in the face of Lebanon's and IC's traumas. In 1983 he quoted the Chinese sage Kwan-Tzu: "When planning for a year – sow corn. When planning for a decade – plant trees. When planning for life – train and educate men!" He added: "This Chinese proverb…often helps me to put into perspective what we are attempting to do as a school community, particularly during these turbulent years.…One never really stops learning, and the skills and study habits and attitudes that you have developed this year in your formal schooling should open up new visions and opportunities for a better life. This growing awareness of one's potential, which is central to our educational philosophy at IC, is expressed in another saying: 'A child's mind is a candle to be lit, not a cup to be filled.'"

In 1985, Reynolds told the graduating class: "It occurs to me that our success as a school owes much to the qualities you have brought and shared with us.…Unfortunately, in such turbulent times, we have been so overwhelmed with concern for security, for finances, for providing classrooms when damages have occurred and campuses lost that our appreciation of the most precious element of the school has unintentionally been diminished. Each student is unique, with hidden talents and resources that only need to be tapped. My message this year is a special tribute to all students of IC."

At long last, the unusable Mechref campus was sold in December 1985, not long after the purchase of the old British Embassy premises in Ras Beirut. This spacious building relieved much of the growing pressure for classrooms and other space. IC enrollments had climbed well above the 2500 level, some five times the number of students originally anticipated when the first campus was being built before World War I.

The dangers increased, especially for a highly visible American like President Reynolds. Hostages were being seized. His family reluctantly went home to Massachusetts; Al Reynolds and his friend and colleague Tom Weaver moved to a then safer East Beirut. Weaver reports that Reynolds kept working ceaselessly for his beloved school, but was finally overwhelmed by a fatal heart attack brought on by anxiety and overwork in October 1986.

IC's stunned trustees appointed one of their number, Thomas Hill, interim president and named Edmond Tohme deputy president. In the years since then, with the appointment of Gerrit Keator as president, the school has moved indomitably onward, living its non-sectarian principles, toward the time that Keator and the global IC community looked forward to: when peace and harmony seem possible again in Lebanon. IC will be well represented in the rebuilding.

Students sign the back of IC's centennial flag.

The library in Rockefeller Hall.

It has seldom been easy. In the 15 years of Lebanon's civil war (See "IC and the Lebanon Crisis," page 26), IC faculty, staff and students have daily braved shooting and crossed checkpoints to get to school, observed "shell days" – rather than "snow days" – when they couldn't get to school at all, and missed after-school activities so they could get home early. During the civil disturbances of 1989, they saw their cafeteria and two classrooms shelled, one of their buses shelled and burned, and missed three months of classes.

Yet in this centennial year, the school is full once again, with students from 19 countries attending classes on the Ras Beirut and Ain Aar campuses. "And in spite of everything," says Keator, "the students still have the education-work ethic of the founder. It has run deep for generations and continues to the present."

What has made education at IC so different, so special?

Some of the differences are interesting, but superficial. For instance, secondary students at IC can work toward one of three possible diplomas: an American high school diploma, a French *baccalauréat* or a Lebanese *baccalauréat* with different requirements – no small feat for a school with such a small faculty. Yet all of the teachers are multi-lingual, able to teach classes in either English or French as well as in Arabic.

The more fundamental differences lie in educational concepts once considered radical and ahead of their time in the Middle East, but now accepted as positive and effective modes of teaching: for example, non-graded classrooms, an emphasis on athletics and extra-curricular activities, student employment for hands-on learning, and school counseling on future careers. All of these concepts were, at the time they were introduced, a far departure from the century-old, French-pattern norm of Lebanese education.

With the success of 100 years now solidly in hand, President Keator and the Board of Trustees are setting goals for the year 2000.

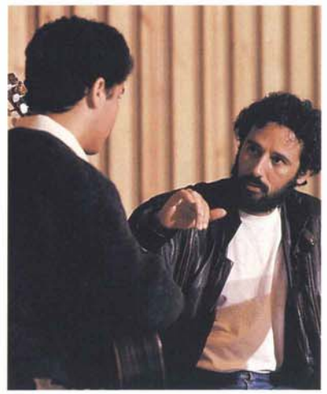
Over the years, IC has relied primarily on student tuition to finance its non-sectarian, non-profit operation. Nowadays, with the damage from the civil war to be repaired, American aid being cut, continued government support in doubt, and the cost of educating one student exceeding one student's tuition, the financial gap has had to be closed by using annual gifts and by dipping into the school's endowment funds – not a healthy situation. Funds fall far short of needs.

Yet school administrators and trustees are optimistic that, in this centennial year, IC's friends and alumni will remember the school that helped them launch their careers, and give accordingly.

"The Middle East will not always be in the fragmented state it's in now," says Keator, "and when its problems are resolved and life can once again revert to peace and harmony, IC students – because of their training and experience – will be at the center of things: the center of reconstruction, the center of growth and, perhaps, the center of a new era."

Aileen Vincent-Barwood is a former Middle East correspondent, newspaper editor and author of "North Country Editor," who now free-lances from upstate New York.

IN TUNE



When Brazilian-born Sergio and Odair Assad play their guitars, critics reach for new adjectives and audiences gasp at the technique and depth of feeling they bring to a broad range of music.

"Whether by instinct, training or sheer hard work – or, more probably, a blend of all three – the Assad brothers achieve levels … which are phenomenally fine," wrote one critic after a concert in Australia.

Sergio Assad chuckles at the assessment: "After playing together for more than 25 years, Odair and I think and play the same way. We don't have to ask. Our brains and fingers just seem to know what the other is going to do."

Sergio and Odair, called "the cream of classical guitar duos" by *Classical Guitar* magazine, were born in São Paulo 38 and 34 years ago, respectively, and began playing Brazilian folk music at their father's knee. Their grandfather had emigrated to Brazil from Lebanon in the early 1900's and joined São Paulo's large Arab community.

Despite a local reputation as talented guitarists, it wasn't until a newspaperman from Rio de Janeiro heard them play that their career began to take off. The journalist encouraged them to study with Monina Távora, a disciple of classical-guitar legend Andrés Segovia.

"Our father loved music. He moved the family to Rio so we could study there," says Sergio. "For seven years we studied with Távora before she thought we were ready."

It was worth the wait. When the duo debuted in New York in 1980, *The New York Times* called them "virtually perfect." Since then, the brothers have played all over the globe, touring five continents in 1990. Their first US album, of music by Latin American composers, received *Ovation* magazine's "Recording of Distinction" award. Their second, *Alma Brasileira*, was released in 1988.

Sergio, who lives in Paris when he isn't touring or in Brazil, says it was nearly impossible to grow up in his homeland and not be interested in music. "It is a very, very big part of Brazil. Odair and I were influenced by all kinds of music when we were growing up, from classical and jazz to folk to popular music from all over."

Though their father was raised in an Arabic-speaking home, Sergio says the Middle East had little direct influence on him and his brother during their childhood years in Brazil – "unless you could say it was in our blood.

"Middle Eastern musical influence has only come in the past six or seven years, but I think we are affected by everything we hear. Somehow, it is incorporated in what we do," says Sergio, who has toured in Turkey and the Middle East. "We play classical, jazz and a mixture of everything. We don't want to be limited. If it is music, we will try it."

In addition to performing, the two teach master classes at colleges when they tour. "The brothers' technique is pristine and dazzling," wrote a teacher at Iowa's Luther College after one of these visits. "And in the master class, Sergio's teaching and comments were full of wisdom."

But it is their concerts that draw the most praise.

"What has 12 strings and flies?" wrote *The Washington Post*'s critic. "The Assad duo, guitarists whose lightning speed, versatility and taste earned them highest marks… Either [one] could captivate an audience. When they pool their talents, the results are truly amazing."

Brian Clark, a regular contributor to Aramco World, *free-lances from Washington state.*

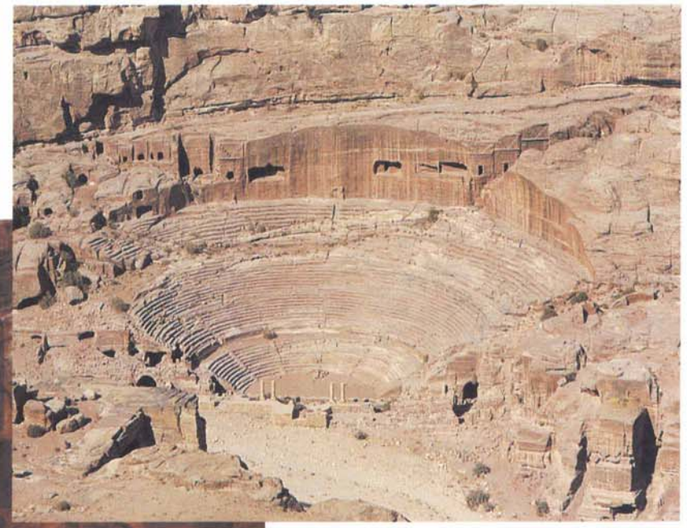
WRITTEN BY BRIAN CLARK
PHOTOGRAPHED BY CHAD EVANS WYATT
AT LE DOMAINE FORGET DE CHARLESVOIX, ST. IRÉNÉE, QUÉBEC

PETRA

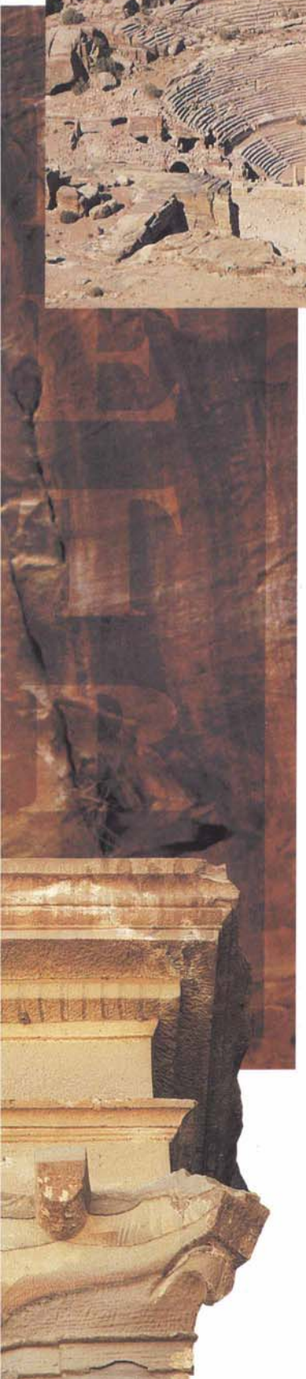
MYTH AND REALITY

WRITTEN BY PHILIP C. HAMMOND
PHOTOGRAPHED BY VIVIAN RONAY

When Harrison Ford finally found the Holy Grail inside the Khaznat al-Faroun at Petra, at the climax of the film *Indiana Jones and the Last Crusade*, a new myth was born. But Ford, and his scriptwriters, were only following in a long line of people who have contributed to the myths, misinformation and confusion surrounding the fabled "rose-red city" of Petra – not only since its rediscovery in 1812 but as far back as the Middle Ages.



Like the "Palace" and "Urn" tombs at right (and detail below), the so-called Treasury of the Pharaoh on previous pages is in fact a Nabatean tomb, albeit probably a royal one. At left, the theater of Petra.



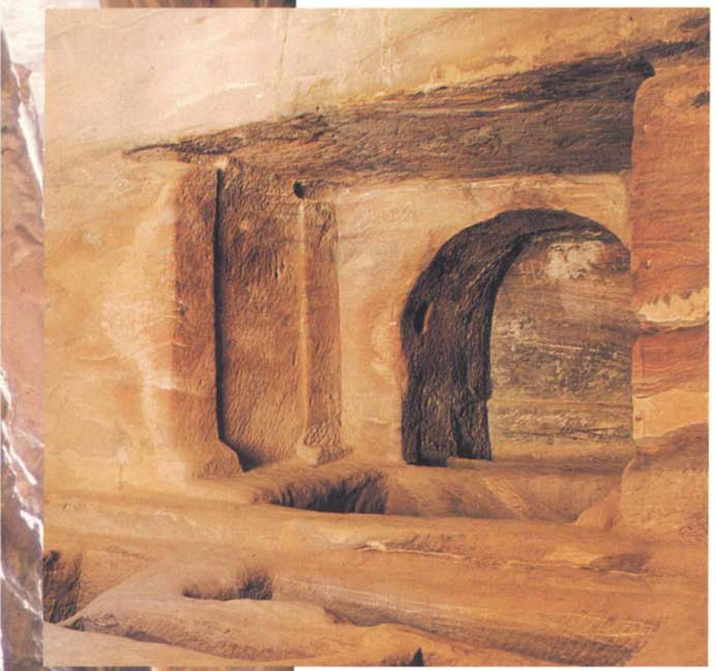
The list of misconceptions with which Petra has been plagued over the centuries is almost overwhelming. Most are harmless errors in names, dates, attributions and the like, but, taken as a whole, they detract greatly from the reality of this important scenic and archeological site.

Since Indiana Jones had to reach his goal via the Shiq, the two-kilometer (2200-yard) chasm leading into Petra, perhaps that is a good place to begin a demythologizing tour of the site. The Shiq is a great cleft in the earth, formed in the hazy depths of the geological past by the same earthquake activity that has plagued the area ever since. Its narrow, winding route through the lofty cliffs which protect the site on the east remains one of the great experiences for the visitor today, and is probably responsible for the belief that it was here that Moses struck the rock to secure water for his wandering people after the flight from Egypt – the first of the Moses-linked stories now associated with the whole Petra Basin. The wadi (valley) that bisects the ancient city center was dutifully dubbed Wadi Musa (Valley of Moses), a name first encountered in the records of the Crusaders.

The Crusader leader Baldwin, just before he became king of the Latin Kingdom in AD 1100, was summoned to Petra by "the monks of Saint Aaron," those records show, who claimed they were being harassed by "the Saracens." After rescuing the monks, Baldwin returned to Jerusalem to be crowned and to rethink Crusader strategy in his new kingdom. He soon discovered that there were no fortified points south of "The Castle of Saint Abraham" at Hebron, and he hastened to mend that deficiency. Along with the fortresses still standing today at Kerak, Shobak, Tafilah and elsewhere in Jordan, a fortress was erected in the "Valley of Moses" and the legend of Moses' visit to Petra was thus given official recognition. Obviously, the monks of Saint Aaron had much to do with this whole affair, the better to establish their right to demand Crusader protection.

Little deceits can get out of hand, however, and soon other signs of Moses' visit appear at the site. The Khaznat al-Faroun, where Indiana Jones made his great discovery in the 1989 film, is another victim of the early monks' tales. Khaznat al-Faroun means "the Treasury of the Pharaoh" – and a myth goes with the name: The Pharaoh of Exodus, having mobilized his forces to recapture the fleeing Hebrews, had reached Petra – after his slight embarrassment at the Red Sea. But by then the weight of his treasury, thoughtfully carried along, had begun to slow the progress of his army. As a result, the story goes, the Khaznat al-Faroun was created, by magic, and the Pharaoh's wealth deposited in the urn-like decoration on its top. One can still see the pockmarks of Bedouin bullets, fired at the "urn" in the vain hope that Pharaoh's gold would come tumbling down!

In reality, the Treasury is a Nabatean tomb, probably royal, possibly even that of the famous King Aretas IV, Petra's most enthusiastic architectural developer. The almost 40-meter-high (131-foot) facade, hewn out of the living rock of the cliff which faces the city side of the Shiq, is only one of more than 800 carved monuments attributed to the Nabateans during their occupation of the site, from sometime before the third century BC to the late fourth century of our era. Inside the massive doorway, the tomb chamber lacks the decor found by Indiana Jones – there are no Crusader statues, huge stone lions or inset seals in the floor – and represents instead the typical, rather plain interior design of Petra's funerary monuments. It is, of course, the facade itself, one of the finest examples of Nabatean carving, which even after some two millennia still awes the beholder who enters its forecourt from the winding Shiq.



Nabatean tomb interiors were usually very plain (left), in sharp contrast to the dramatic first view of their exteriors (below).

Somewhat later in Petra's history, probably also at the hands of Crusaders or monks, another splendid royal tomb, situated high on a mountain top, was refurbished for religious use and received the name ad-Dair, the Monastery. Originally neither a church nor a monastery, the tomb is today one of the site's main tourist attractions, with the connotations of its fictitious name still firmly fixed.

Other tombs have likewise been given gratuitous names, even if no grand legends are attached. For example, the ones which span part of the western face of the mountain, Jabal al-Kubthah, through which the Shiq meanders, are known today as the Royal Tomb Group, with each tomb facade possessing a rather fanciful title – Three-Storied, Silk, Corinthian, Hall of Justice. Since only one of Petra's tombs has any inscription on its facade at all, inventing popular names for the more impressive ones has become a tradition for map-makers and tourist guides. Probably, in the course of time, each tomb will also achieve a story to go along with its name. This is, of course, relatively harmless myth-making – as long as listeners don't take the matter too literally or too seriously.

But tombs are not the only monuments at Petra which have acquired names and legends. The few standing ruins on the site which escaped total destruction during the devastating earthquake of May 19, 363 – along with many no longer standing – were, and still are, fair game for the same treatment.

The great masonry-built temple to the Nabateans' chief male deity, Dhushares, is a prime example. Awed by the size of the building, myth-makers again invoked the magic of the Pharaoh, and to this day the building bears the name Qasr Bint al-Faroun, the Palace of Pharaoh's Daughter. Here, again, the excess baggage of the pursuing monarch was at issue; this time, however, it was his daughter who was slowing him down. Therefore, the Qasr had to be built in which to park the young lady against later recovery, after her daddy caught up with Moses.

Even a solitary column, left standing after the earthquake's ravages, has been linked to the Pharaoh's fictitious visit to the site: it has been given a rather obscene name that has remained something of an embarrassment to guide-book publishers, who never translate the Arabic.

The temple that this author has been excavating since 1974, probably dedicated to 'Allat, the Nabateans' supreme goddess, has fallen into the name trap as well. Because of feline decorations on the capitals around the altar platform, the "Temple of the Winged Lions" now occupies a prominent place in the clouded annals of Petra, and poor 'Allat is left out of the picture completely.

Less devastating to the innocence of tourists, but absolutely horrifying to scholars, has been the myth-making of map-makers, right up to the present day. The first of the modern cartographers was the self-proclaimed rediscoverer of Petra, Swiss adventurer-scholar Johann Ludwig Burckhardt (See *Aramco World*, September-October 1967). On August 22, 1812, Burckhardt, traveling in disguise, persuaded the Bedouin inhabitants of the small settlement of El-Ji (now Wadi Musa), just outside Petra, to guide him to a local mountain called Jabal Haroun, after Aaron, the brother of Moses. He passed through the Shiq and into the ancient site, as far as the foot of the mountain, beyond which his now-suspicious guides would not take him. Having duly sacrificed a goat to the memory of Aaron, Burckhardt hurriedly left the area, but observed enough around him to produce a map – and the notation in his journal that he had rediscovered Petra.

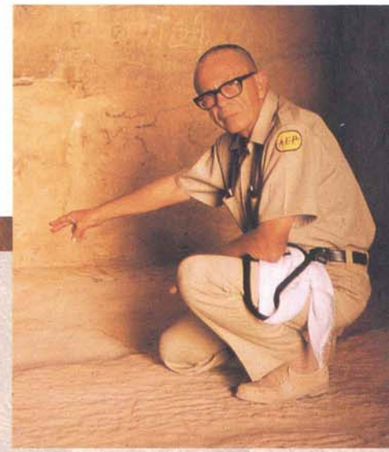
In reality, Petra was never actually lost, although it had been somewhat misplaced since the days of the early Islamic geographers – who had visited the site but were not particularly concerned about its name – and its appearance on the famous Peutinger Table, a 12th-century copy of a map of Roman-period trade and population centers. As late as 1778, Volume II of *The Works of Flavius Josephus*, produced in London by Fielding and Walker, included a map based upon the *Onomasticon* of Eusebius, which accurately located Petra from the ancient distances recorded in the latter work. But as far as the Western world was concerned, those earlier records of Petra's location became irrelevant as people read and appreciated Burckhardt's adventures.

Burckhardt's map, however, raised new problems relating to the topography and place names of the site. In his rapid overview of the area, Burckhardt picked out certain major landmarks – the Khaznat al-Faroun, the Theater, the Qasr and others – but his memory of their locations was only relative and the names he used to identify them – for example, "Kasr Faroun" for Khaznat al-Faroun – were somewhat confused. However, he opened the way for other intrepid travelers. More accurate topography and locations were established, and monuments and other features began to receive new names.

The first truly scientific study of the site, and quite a definitive one, was done by R.E. Brünnow and Alfred von Domaszewski in 1897-98. Maps, sketches, photographs and architectural analysis of the monument types were augmented by same-language references to the reports of all previous travelers to the site. As a consequence, the names given to features up to that time became frozen in the literature, subject only to later attempts to modify them in the present century and the addition of new names for newly discovered spots.

One of the great miscarriages of map-making, still found in guide-books and modern literature, was the "plan" of the ancient city drawn by the eminent German scholar A. Wiegand for Bachman's volume on the site published in 1921. Wiegand examined the evidence of fallen wall lines in some detail and proceeded to outline what he thought were sub-surface buildings, and even to identify their functions. Some modern writers still display Wiegand's plan as a real picture of a city still buried beneath the sand!

The author inside the "Treasury of the Pharaoh."



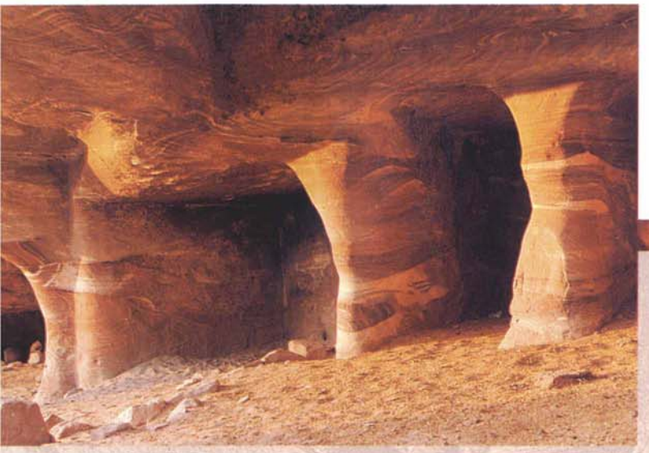
A DAY AT THE DIG

What is a day of digging really like at Petra?

This writer has directed archeological excavations at the Temple of the Winged Lions for the past 15 years, with earlier periods along the city wall and at the Main Theater. The daily routine is part of a life quite different from that of Indiana Jones. More than 200 Arab, American, European and Japanese students have shared that experience at Petra, and helped bring back to life the people of ancient Nabatea.

Morning begins at the grim hour of 4:30 a.m., generally to the sound of the director's tape-recorded bagpipe music, thoughtfully supplied by a colleague at the university. Breakfast is at five a.m. – provided the propane cylinder isn't empty, the cook hasn't overslept and the water supply hasn't broken down – with porridge as a main menu item. Site crews and lab crews are at work by six, with the expedition's student participants rotated on a weekly basis through the various jobs that make up archeology today: supervising (and doing!) the actual digging, surveying, processing the material remains recovered in excavation and recording the results by making drawings, taking photographs, and filling out endless forms. Break time comes at 10 a.m. – a half hour of sardines, bread, jam, tea and just plain rest. Then more work until one p.m., when activity on the site stops for the day and lunch follows.

The menu depends on the supplies currently available in the market at Wadi Musa, and tends to feature rice in great abundance. After lunch, people read, sleep or go for a swim in the small pool in Wadi Siyagha – or make the 40-minute trek to the "real" pool at our neighborhood four-star hotel. "Pottery mat" takes place at six p.m., when the sherds and other artifacts of the previous day are examined, discussed and sampled for later



"Match me such marvels," wrote an English clerical visitor in the last century: "A rose-red city half as old as time." Petra's beautiful varicolored stone is carved with greater or less detail as circumstances required.

drawing. Dinner is at seven – with more rice. At eight, the on-site crews gather at the "Daily Progress Chart" on the wall of the old Nazzal's Camp, the dig headquarters, and work up the stratigraphic results of the day's excavations.

While all this is going on, the field laboratory is busy processing each day's recovered artifacts for registration and interpretation. Pottery sherds are washed, sorted and photographed; bones are identified; stone and plaster are brushed off; metals are cleaned; and the records begin to mount up. Records are the life-blood of a dig, for archeological excavation is destructive, and the only way a site's history can be reconstructed is from whatever is recorded – notes taken during excavation on-site, notes taken in the lab, sherd drawings, photographs, and a host of other records, including actual material samples.

Such is the routine five days a week, for the six to eight weeks of an archeological season. Fridays are days off, for trips around the Petra Basin and similar exhausting recreational activities. Saturdays are devoted to drawing pottery sherds – 1065 of them last season – for dating and comparison with published examples from other sites in the Middle East.

But it's not all work, either. Thirty-five years of contact with the Bedouins at Petra open the way for invitations to *mansafs* – traditional feasts at which roast goat is usually served – weddings, dances and all sorts of other local events. Dart games, card games, music, reading and occasional birthday and un-birthday parties round out the days. People get to know each other through conversation, in camp or at Petra's "general store." An R&R trip to the beaches of Aqaba relieves the monotony at mid-season, with an occasional need for recuperation after the visit.

Myths aside – though we have our own myths and legends as well – such is the reality of archeology at Petra.

Fortunately, with the beginning of archeological work at Petra, modern aerial and photogrammetric surveys have laid out the site with precision. The latest map, produced by the Jordanian government, finally gives the visitor a reliable picture of the site, the actual nature of some of its remains, and the location of its principal monuments.

As more fact was gradually sifted from fancy, myth-making at Petra had to turn to other aspects of the site, and the architecture of Nabatean tomb facades and other visible ruins presented an appealing field.

Brünnow and von Domaszewski were really the first scholars to attempt a classification of Petra's architecture, and their descriptive approach opened the way for a series of later classifications that used different criteria and different dating methods. Unfortunately, until modern archeological work was done on the site, all of these largely lacked a firm basis. Very recent architectural analyses, along with information from excavations, seem to give us more reasonable information about Nabatean architectural style, origins, and dates. Likewise, experts' views on the origin of what is called the "Nabatean Order" in architecture have changed. Scholars now recognize that most of the Near East was flooded with Hellenistic architectural and artistic craftsmanship before a distinctive Nabatean style developed, and that the Nabateans also had a penchant for borrowing ideas as they traded throughout the Roman world. The result of these two factors was a characteristically eclectic mix of tastes.

It was this question of outside influences on Nabatean architecture that allowed for the most extensive myth-making. Initial discussion of foreign influences in the Nabatean architectural orders – such as "Assyrian" crow-step decoration, "Egyptian" moldings, "Roman" canons, and so on – led to suggestions that outsiders had not only influenced architectural style, but had in fact built the monuments as well. Remnants of Western colonial bias strengthened the claim that it was only after the conquest of Arabia by the Romans that certain of Petra's more elaborate monuments could have been created. However, the subsequent excavation of the Main Theater clearly demonstrated original Nabatean construction. Since then, the bias against Nabatean originality and artistry has largely evaporated, and the creative abilities of this early Arab people are being recognized and appreciated more widely.

The city of Petra itself has become still another source of broad-gauge myth-making, much of which can be traced back to one Reverend George Robinson. Beginning with his publication of *The Sepulcher of an Ancient Civilization* in 1930, a multitude of uninformed authors, including some who had never seen the site and lacked any previous experience in Middle Eastern archeology and culture, have proclaimed that Petra was always a "dead city" – a city without a population. The degree of supposed deadness varies from one author to another, depending upon the particular degree of ignorance involved: Some vitality is grudgingly permitted by those who see Petra as an ancient ceremonial or administrative center, but even in those cases no major population is acknowledged as having been present.

The tendency to view Petra as a mausoleum on a grand scale has even reached into official circles, thanks in large part to a survey conducted some years ago by a former US Park Service employee, who even found the Bedouin then living at Petra detrimental to the desired funereal atmosphere.

Yet if one climbs even a small hill near the site and looks down, the extent of the ruins would suggest quite another viewpoint. A city of the dead hardly needed the expanse of recognizable business district along the Paved Street, nor an impressive public theater, nor baths, nor the two major temples now brought to light, nor a magnificently laid-out hydraulic system piping in water from miles away, nor the multitude of cisterns to capture rainwater – not to mention the remains of villas and other living quarters whose floor plans dot the basin.

Certain ancient sources, it is true, suggest a non-urban situation at Petra. The historian Diodorus of Sicily, writing in the first century BC, gives us the earliest authentic description of Nabatean Petra. Relying on first-hand accounts of the late fourth century BC, he describes a non-sedentary, non-agricultural "barbarian" people who harry their neighbors and who have chosen to dwell at Petra in order to live a wild and solitary life. A few scholars, commenting on Diodorus's account, have suggested that he was, indeed, describing Nabatean life at Petra – but life as it was in the late fourth century, some three hundred years before his own time. Too few other commentators have appreciated the time gap between the description and the report of it, and have sought to characterize Nabatean life at Petra in Diodorus's terms. Yet Strabo, writing at about the same time as Diodorus, gives a much different picture. Drawing on an account from a living informant born in Petra, Strabo describes the city as governed by a royal family, abundant in resources, and bustling with a cosmopolitan population. Based on today's archeological evidence, the latter portrayal of both people and city is accurate. Still further, the Nabatean origin of Petra's technology and public works can no longer be denied.

Ancient rock-cut stairway leads up Mount Nejr. Climbing several cliffs and mountains within the canyon is necessary to see broad views of the city (right).

Indeed, after Rome's annexation of Nabatea in AD 106, it was not long before the city was recognized as a metropolis in the official sense, a title not bestowed by the Roman Senate on "dead" cities.

Most of the ancient sources left one question begging in their descriptions of the Nabateans: the origin of the people themselves. Although Diodorus does casually place Nabatean villages in the area of the modern Gulf of Aqaba, he neglects to say whether this was an original homeland or simply an extension of the Nabatean kingdom from Petra at a later time. Numerous studies have been undertaken in an attempt to solve the problem, and the bulk of evidence, it would seem, places the homeland of the Nabateans somewhere in modern Saudi Arabia, from which they migrated along the coast, finally settling at Petra.

A recent study by this writer suggests another overlooked possibility. From hints dropped in the contemporary literature, from the strange migration of the indigenous Edomites at Petra to the west – where they became known as Idumeans – and from the question of the origin of the rather advanced technologies displayed in Nabatean art, metallurgy, hydraulics, architecture and other fields, it is possible to recognize in the later Nabatean culture a remarkable blending of two early Arab peoples – the long-sedentary Edomites and the vigorous, mercantile, caravaneering Nabateans. The synthesis of the two resulted in one people with a combined strength in both technology and trade, with the more vigorous Nabateans providing the final national name for the blend. Those Edomites discontented with the new scheme simply migrated to a new home and received a Hellenistic version of their original Semitic name in later literature. By the time of Diodorus's first-century-BC report, the symbiosis had been forgotten.

There is one final myth about Petra that should be mentioned, especially after Indiana Jones' recent visit: the nature of the real archeological fieldwork involved.

The drama of Indy's triumphant dash to the Khaznat al-Faroun, the romance of a "lost city" of magnificent stone monuments, the promise of stupendous discoveries in the next trowel-full of earth all obscure the everyday grind of the archeologist's labor – the price of the knowledge that he or she uncovers about an ancient culture, its nature, its development and the processes that brought it into being.

There is romance, of course: Anyone who has ever visited Petra has felt the site's dramatic pull upon the senses. Yet there is also the drudgery, dust and frustration that accompany excavation – and disappointment, too. Petra does not reward the archeologist with treasure in the commonly accepted sense. Rather, there is a daily mass of broken pottery, corroded coins, mutilated architectural debris, unknowable fragments and the constant knowledge that each season of work is only a pitiful drop in the bucket of research that really needs to be done in Petra and surrounding sites.

Yet there do come, now and again, complete vessels, readable coins, bits of inscriptions, decorated fragments, architectural surprises and the other finds that delight the hearts of dedicated excavators. These discoveries, along with the other material remains and the intricacies of the depositional strata of occupation – not the imaginative legends – are what really tell the story of Petra and her people. They are the building blocks for reconstructing the culture of a people, for understanding their history and its chronology, and for seeking out the processes that made them what they were. They are what make the people and the city, the rose-red city of Petra, come alive once again.

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Days in the Gardens of Spain

WRITTEN BY DONALD SCURR
PHOTOGRAPHED BY TOR EIGELAND

In a canvas tension-structure, workers test the effects of a central cooling column, water channels and mist sprays (inset) that will be used to cool and humidify public areas at EXPO '92.

August in Granada: A long, limp line of tourists shuffles lethargically toward the high entrance gates of the Palace of the Alhambra. Except for the black-garbed señora at the pay booth and a single, bored Guardia Civil, there is not a Spaniard to be seen. Prudent locals stay inside their cool houses and offices at midday in high summer, flooding forth only at dusk to resume the vivacious street life of southern Spain.

Noel Coward was wrong. Not only mad dogs and Englishmen, but also, evidently, Frenchmen and Germans, Japanese, Americans and Danes are all willing to venture out in the noonday sun.

The afternoon wears on; so do our spirits. Sticky, panting and exhausted, we approach the gate, our fractious children called to order by a chorus of parental voices making similar threats in a dozen different tongues.

At last we pass through the entrance into a cool, dappled world of shady trees, screened from the sun's glare by moist foliage and soothed by the sound of running water. With relish, we note a remarkable drop in the temperature: There's a difference of about 17 degrees Centigrade (30°F) between this inner courtyard and the outer one where we waited in sweaty discomfort. The relief is magical – but what's the explanation?

Can the transformation be natural? Is it some secret of the gardener's art? And who were the gardener-wizards who subdued the strength of the sun itself?

The beauty of alabaster, the slenderness of marble pillars and the two-colored stone of the arches in the palace's dark interior reveal the answer: The Alhambra and its gardens were built by the Arabs who ruled and populated this part of Spain for 800 years, and whose civilization flowered here as nowhere else since 1492. Their arts embraced not only the creation of exquisite architecture but also the talents of Arab gardeners, masters at providing relief from inhospitable climates.

It is precisely this blissful escape from a relentless sun, just as harsh in today's Spain as it was 500 years ago, that planners of EXPO '92 hope to recreate next year when that event is staged in nearby Seville.

The organizers of that great "Universal Exposition" – only the third held in the last half-century – expect a *daily* attendance of over a quarter of a million visitors throughout the summer months, all occupying an area the size of a few city blocks. For them, the planners aim to weave the same environmental spell that artful Moorish designers did between six and seven centuries ago in the enchanting Generalife pleasure gardens of the Alhambra (known to the Arabs as Jannat al-'Arif).

It was Spain's Arab rulers who introduced the art of water gardening to Granada – the art that used the desert-dweller's supreme luxury to devise a refreshing private retreat in the midst of baking heat. When the Arabs arrived in Spain, they brought with them the skills to recreate such gardens, mingling trees and shrubs with water courses, fountains and cascades. There, one could enter a world where streams murmured into pools of sparkling water – pools lined with blue ceramics to increase their apparent depth – to soothe the body and refresh the spirit.

It has been estimated that during the Arabs' dominion in Spain there were 50,000 villas with water gardens in the Seville district alone. The gardens offered irrigation for the diversity of plants that the Arabs loved. Flowers, fruits and vegetables were mixed without inhibition; the Arab gardener saw beauty equally in onion or bougainvillea, artichoke or jacaranda. Aquatic plants and animals were cultivated where sheets of still water captured glints of light. These were serene places, free from the tyranny of the sun's glare – and they are part of the heritage and the soul of Spain today.

The modern Spanish poet Federico García Lorca, a poet from and of Granada, wrote such lines as

"Green I love you green.
Green wind. Green boughs."

And the music of Spain – of Albéniz, de Falla and Granados – often recalls the sound of lapping water, or the sight of reflective sheets of water strummed momentarily by a gentle breeze.

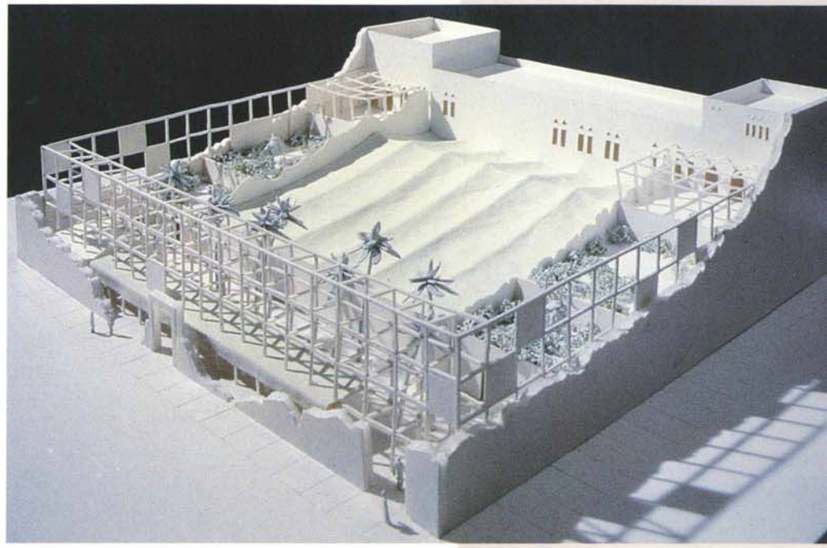
When King Juan Carlos formally opens EXPO '92 – or to give it its full name, The Universal Exposition Seville 1992 – on April 20, he will be welcoming the first freshet of a predicted tidal wave of 36 million visits by over 18 million guests. The exposition, with its 120 international pavilions on the 251-hectare (620-acre) site, its auditoria and overhead transit system, will surely be breathtaking – but not because of an overheated and exhausting atmosphere.

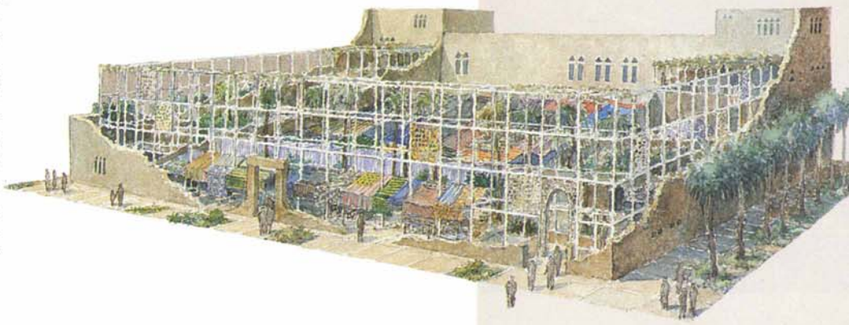
The vast crowds will be able to breathe easily, relaxing in the same relatively cool environment that gives so much comfort in the tempered conditions of the Alhambra Gardens. Servando Alvarez, of the Department of Fluid Mechanics and Energy Engineering in the School of Thermal Engineering at Seville University, outlined the solution. He explained that his scientists, working with expert landscapers, hope to create a "microclimate" extending over the outside walkways, parks and gardens of the exposition. And in resurrecting skills of their Arab predecessors, linked to tomorrow's technology, his team may help bring about a renaissance of the traditional water garden in landscaping projects worldwide – "from humble domestic gardens to more ambitious schemes for great parks and estates," Alvarez hopes.

The year 1992 will be a momentous one for Spain. It will see the completion of Spain's six-year integration into the European Economic Community, the opening of the Olympic Games in Barcelona, Madrid's turn as European Cultural Capital for the year, and, climactically, the commemoration of a seminal event in world history – the 500th anniversary of Columbus's voyage that led to the discovery of America – that was planned and prepared in Seville: on the very site of EXPO '92.

Welcoming the World

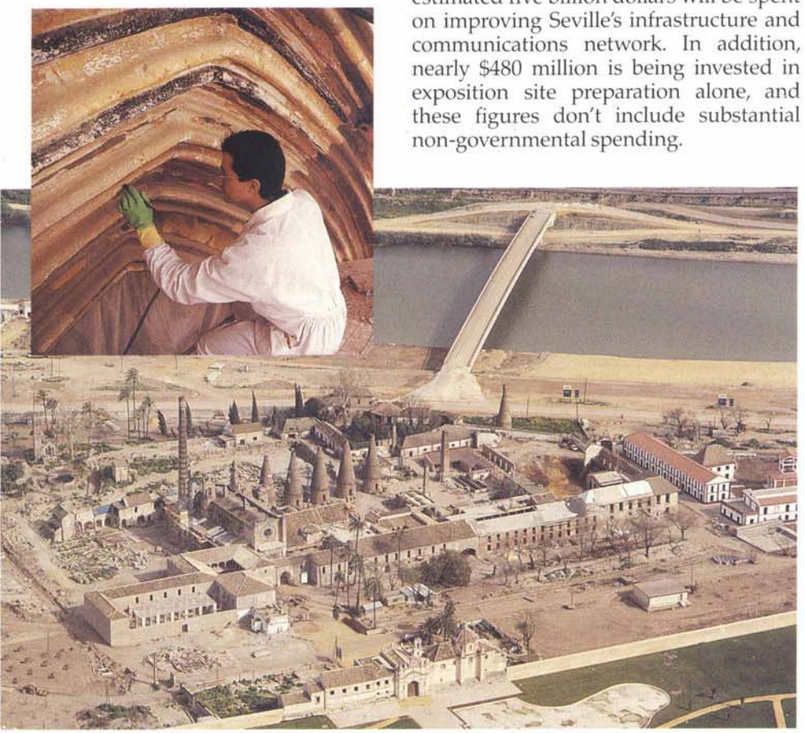
The Saudi Pavilion at EXPO '92 opens up its facade to welcome the world. The rectangular grid that defines the pavilion also supports energy-conserving cooling towers, reflects the geometric origins of Arab arts and sciences and symbolizes the unity of Islam, say the architects, SITE Projects of New York. The spectator waiting to enter lingers in "a pleasant microcosm" of the kingdom, including an active *suq* or marketplace, an oasis and a garden of desert plants. The pavilion's inner courtyard is sheltered by an immense tent made of Bedouin textiles, a visual tribute to Saudi regional diversity and the country's rich crafts tradition.





Aerial views of La Cartuja Monastery (top), and the site (bottom) of EXPO '92.

Inset: Workmen restoring La Cartuja Monastery.



The Universal Exposition at Seville will last 176 days, till October 12, the actual date of Columbus's landfall in the New World. Its theme will be "The Age of Discovery," referring to discoveries in all fields of human endeavor from the 15th century to the present day and on into the 21st century. Over 80 nations will take part, and an estimated five billion dollars will be spent on improving Seville's infrastructure and communications network. In addition, nearly $480 million is being invested in exposition site preparation alone, and these figures don't include substantial non-governmental spending.

At the core of these plans is an ambitious scheme to divert the course of the Guadalquivir river, known to the Arabs of Andalusia as al-Wadi al-Kabir, on which the city stands. For over 200 years after Columbus's first expedition, the river gave access to the Atlantic and prosperity to Seville. With its inland port and Casa de Contratación, an official exchange founded by Queen Isabella I to encourage and control all trade with America, Seville relied on the Guadalquivir to provide a vital outlet for expeditions to the New World – including those of Italian navigator Amerigo Vespucci, who sailed from the city to prove that Columbus's discoveries were not the Indies or China but a new continent, and of Portuguese explorer Ferdinand Magellan, who set out to circumnavigate the earth. Treasure from Spain's American possessions flowed through the port: spices, jewels, gold and silver, creating such wealth that Seville was called "the richest city in the known world."

But when the Guadalquivir silted up in 1717, Seville's golden trade with America dried up too; the exchange concession was transferred to Cadiz, on the Atlantic coast, and Seville's long economic decline began. This year, in a reversal symbolic of Seville's renaissance, the Guadalquivir is to be returned to its original course.

Between two branches of the river lies the island of La Cartuja, named after a 14th-century Carthusian monastery where Columbus often stayed and where he was buried for 27 years. Following a period when it was used as a busy *arrabel*, or Arab market, the island – although close to the heart of Seville – has remained largely inaccessible, constantly flooded by the wayward Guadalquivir, occupied by the monastery of Las Cuevas (The Caves), in which Columbus actually planned his first expedition, and later used as a center for the production of ceramics. La Cartuja will be the site of EXPO '92, and the exposition's legacy to the citizens of Seville will be the island reclaimed for their enjoyment. A main railway line and extensive sidings will be relocated in order to provide an unspoiled view of the old monastery, restored and converted into a royal pavilion. Five new bridges will allow visitors to walk across the river from the city center to the exposition, which will offer no fewer than 113 restaurants, 105 shops, 13 entertainment areas and a network of elegant plazas. And integrated with the scores of pavilions and displays will be 180 hectares (448 acres) of gardens planted with a total of 300,000 plants and shrubs, as well as nearly 60,000 mature trees.

People will be able to stroll through agreeably shaded pedestrian ways, flanked by 50 kilometers (30 miles) of hedges, past fountains, waterfalls, flowing channels and the bright surface of a 16-hectare (40-acre) lake mirroring the sky. Aside from the natural enchantment of this profusion of plantings – jacaranda and thorn, maple and olive blending with poplar and oak, orange and California pepper – the vegetation will fulfill the same role as was conceived by the creators of Spain's Arab gardens. The tree and shrub formations will combine with the flow and play of water to condition the air by absorbing the sun's energy. Leaves will permit water evaporation to cool the air and increase humidity from 20 or 30 percent to between 50 and 60 percent.

Combined with a welcome reduction in temperature of perhaps as much as 22 degrees Centigrade (40°F), this modification in humidity over the whole 251-hectare (620-acre) site justifies the description "microclimate," surpassing even the accomplishments of the Arabs in their cool, fragrant gardens. To augment traditional techniques, Seville University's experts have experimented with buried pipes, "cold" pavement and scientifically devised vegetation shelters. Their stated aim is "not only to improve the natural climate conditions of La Cartuja island to make a stay in the area more attractive, but also to make the microclimate surroundings favor social communication among the participants."

The Spanish government, both at the national and local levels, sees EXPO '92 as a means of re-establishing Seville and Andalusia as the dominant industrial and commercial center of the western Mediterranean in the next century – thus commemorating the quincentenary of Columbus's voyage in the same spirit of enterprise that guided him. In this context, the goal of fostering social communication is crucial.

The solutions proposed by Seville University, which include natural resources of shade, water and vegetation linked to innovations like computer analysis of thermal conditioning and protection from solar radiation, have been tested in an experimental area on La Cartuja island. The space devoted to these tests incorporates a number of cooling methods along with instruments that measure and evaluate their performance. Canopies, awnings and pergolas are included as well as more technical methods, for the Sevillanos have centuries of experience at dealing with the long and extreme Andalusian summers.

Extensive nurseries raise plants and trees to transplant throughout the EXPO '92 site.

Although the scientists concede that the thermal comfort they want to achieve will not be the same as that of air-conditioned interior spaces, they do claim that the open spaces of the exposition will offer a noticeable and welcome improvement over the general environment.

To attain this peaceful contrast with the heated, feverish atmosphere of the outside world was the primary objective of Arab and Muslim gardeners, who believed that, in a garden, people should be free to relax in open spaces which, despite being exposed to intense heat, gratify their eyes, ears and sense of well-being. This philosophy was imaginatively expressed during the Islamic world's greatest period of garden-making in the 14th century, when the names of 11 royal gardens were recorded near Samarkand in the time of the conqueror Timur (Tamerlane), and there were probably many others belonging to his nobles.

A visitor reaches into the spray from one of the misting nozzles that with fountains (inset) will be used for both cooling and decoration of the EXPO site.

Historian D.P. Clifford has described the extensive Timurid gardens and their derivatives, the Mogul gardens of India, as being "pleasances of water, meadow, trees and flowers, in which buildings took a subordinate place. Although these garden buildings were permanent, their subordinate role and the lightness and luxuriating frivolity of their design mark them as heirs of the casually positioned tents seasonally erected in hunting parks. Trees were planted sometimes in regular quincuncial patterns (one in the middle and one at each corner of a square or rectangle) but more often freely. In all types of Islamic gardens, flowers were lavishly used. Their presence was even simulated in garden carpets and in the woven hangings that were used as temporary screens."

The elegant architecture of EXPO '92's pavilions, restaurants, administrative buildings and other structures will work in harmony to rival the environments of the most splendidly efficient Islamic gardens. Blending with extensive afforestation, the buildings, walkways and transportation facilities will be positioned to ensure that drafts of cool air play past angled walls and corners. These breezes, wafting along pedestrian routes, will be encouraged by the layout of the exposition and should interact with computer-controlled waterflows to reduce temperatures and hence create the desired microclimate.

Below ground, a dense network of fiber-optic cables is being laid to carry the voice, data and television signals that EXPO '92 will generate. When the exposition closes, with the last of a series of spectacular sound-and-light shows to celebrate both its climax and the anniversary of Columbus's landfall, these installations will remain behind to serve the high-technology city planned for the site. University faculties, research institutes and laboratories are already committed to moving in during 1993. And the old city of Seville, now blessed with an access to La Cartuja so long denied, will benefit from the construction program, which will provide one of the most advanced urban and inter-urban communication networks in the whole of Spain. With an Andalusian regional development plan to provide grants and tax advantages to attract further investment and encourage the creation of new business – matched by an already advanced schedule to renovate and refurbish many of the city's historic buildings – Seville is poised to take what EXPO '92's original commissioner general, Manuel Olivencia, described as "a giant stride into the economic promise of the 21st century."

But economics is only part of the plan, Olivencia explained. "We also have to restore the heritage of this region and to lay the groundwork for its future. A Universal Exposition is an entertainment, but it also creates shock waves that act on the scientific, cultural and educational aspects of society. It can impact inter-European and Ibero-American relations and it affects Spain's role in international affairs. Our ultimate aim is to contribute to simple but elusive concepts such as understanding, solidarity and peace."

So the physical greening of the site of EXPO '92 – the wealth of trees and vegetation, the cool fountains and lakes – will create a remarkable environmental microclimate which may contribute to the creation of an economic macroclimate whose result is a "greening" of another, greater kind. Spain's Arab rulers of a half-millennium ago, who presided over eight centuries of prosperity, peace and culture, would have understood and approved. So will exposition visitors in the heat of next August in Seville.

Donald Scurr is a London-based free-lance journalist with a great affection for Spain.

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