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ARAMCO WORLD

JANUARY-FEBRUARY 1988

CAMELS DOWN UNDER

Published by Aramco, a Corporation, Suite 1200, 1667 K Street, N.W. Washington, D.C. 20006

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DESIGN & PRODUCTION
Scurr, Barnes & Keenan Ltd

PRINTED IN THE USA
Shenandoah Valley Press

Aramco World is distributed without charge to a limited number of readers with an interest in Aramco, the oil industry, or the history, culture, geography and economy of the Middle East.

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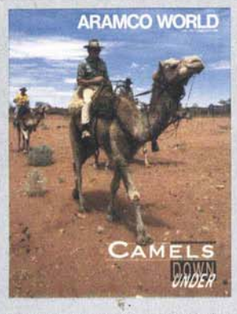


Cover: Now saddled and bridled as tourist transport outside Alice Springs, these camels were captured in Australia's outback from wild herds that number around 50,000. Their ancestors were imported from the Middle East and Southwest Asia, but trade may soon flow the other way. Photo: Arthur Clark. Back cover: Bedouin women carry home a coil of camel's-foot vine (*Calligonum comosum*). The valued fodder plant grows on top of dunes in Oman's Wahiba Sands. Photo: Tor Eigeland.

◀ Sharp angles of the Sackler Gallery's skylights, staircases and still-water pools contrast with the soft shapes of the sculpture on display.

ARAMCO WORLD

VOL.39 NO.1 PUBLISHED BI-MONTHLY JANUARY-FEBRUARY 1988

The Hawks of May

WRITTEN BY
JOHN M. McDOUGAL

PHOTOGRAPHED BY
SALAH BETTAIEB/ALPHA

What has eyes like gold lira,
Is majestically handsome,
Makes a man neglect his work,
And rides the wind?

For about an hour we tramped across the stony fields at the edge of the Forest of Darchichou, raising only dust and a few larks. No dogs were with us, so we walked loudly and quickly through the ripe winter wheat that in mid-May was ready for the harvester's scythe. We were trying to flush quail, if there were any quail, before they could run away. It was five in the afternoon on the Cap Bon peninsula of Tunisia, about 165 kilometers – 100 nautical miles – southeast of Marsala, Sicily, and my hunter's concentration was waning from the unremitting beauty of the place. The wheat was gold, the caliche soil brick red. A rectangular minaret in the village of El Haouaria gleamed white in the setting sun. The azure Mediterranean was slowly turning gray as clouds crept in from the sea.

Aleya Samoud, my host from the nearby port of Kelibia, set the pace to my left. His nephew Chedli walked zigzags through the grain to my right, beating the stalks with his wooden staff.

Suddenly we heard that familiar, breath-stopping, staccato thunder of quail on the rise. Instincts take over at times like this: I picked out one of the two quail, raised my elbows, and – my hands came up empty. I didn't have a gun. No one had a gun. The only gun was an ancient double-barreled shotgun Aleya had left in the truck.

Instead, Aleya went through the moves of a javelin-thrower and let fly from his right fist a feathered missile. The foot-long sparrow hawk locked on to one fleeing quail and matched him turn for turn. Before his low-flying quarry had gone 50 meters (150 feet), the hawk had seized the quail in his talons and gone to ground in a low hedge.

It was the first kill of the afternoon. We had found quail, but it was a day for hawks.

Whether one hunts with a goshawk in Europe, a Cooper's hawk in North America, or an eagle in Central Asia, employing a diurnal hunting bird of the zoological order Falconiformes is falconry. The strong and graceful peregrine falcon, *Falco peregrinus*, is the best-known star of the sport, partly because it is found on all continents and large islands except Antarctica: The word *peregrine* itself means "foreign." Archeological evidence from ancient Sumeria attests to the enduring popularity of hunting with them.

But men hunt with many raptors besides the peregrine. In Europe, there are goshawks. In Africa, there are harriers. And on both continents, as well as in Soviet Central Asia, there are Eurasian sparrow hawks, *Accipiter nisus*, the bird the Samouds and others use for hawking in northeastern Tunisia. It, too, has hunted with men for ages – no one seems to know how long – and can even boast of an archeological record: The ancient Egyptian gods Ra and Horus were depicted as humans with sparrow-hawk heads, and the hieroglyph for an individual's soul was often a sparrow hawk with a human face.

From Morocco to Afghanistan, the Middle Eastern countries are renowned for their devotion to falconry. Countless are the paintings and photographs of elegantly robed kings, amirs and shaykhs with their regal birds of prey held high. Though realistic, images such as these can leave a Western viewer with the impression that falconry in the Arab World is for the elite, that only the wealthy keep and hunt hawks.

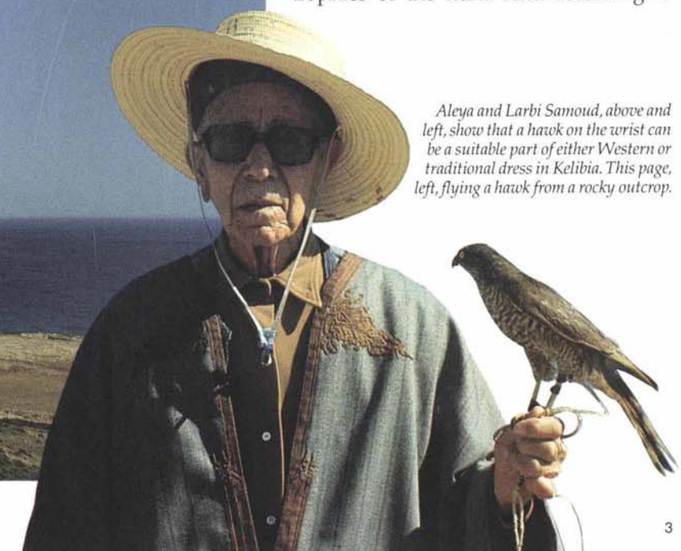
Based on my experience in Tunisia, this is a mistaken impression, reinforced, perhaps, by European history and by our contemporary perceptions of falconry. Yes, it was the Arabs, most likely the Muslim military elite, who introduced (or reintroduced) falconry to Europe, but it was the European aristocracies who dominated the sport until it began to die out in the 16th century, when guns finally and irrevocably replaced hawks and the gunsmith supplanted the mews keeper.

When I went to Kelibia, a town of about 30,000, to meet falconers, I expected them to be wealthy, leisured, and a bit more enthusiastic about sport than about working for a living. My preconception of Tunisian falconry was of the North African equivalent of fox hunting in Virginia or of a wild boar hunt on a noble French estate.

I was wrong.

Kelibian hawkers run the gamut of local income levels and occupations. Of the hunters I met at eight o'clock one Sunday morning in a rustic sidewalk cafe in the middle of town – the regular hour and locale for swapping hawking stories each spring – one was a small-businessman who had, for several years, organized the annual June hawking festival in El Haouaria; one was a retired medium-acreage landowner, wearing a traditional *chechia* hat and *jebba* robe; and another was a self-employed auto mechanic with a one-room garage, too much work and not enough free time to hunt. Even the boy serving mint tea joined in the conversation about hawking. These men all shared a passion for falconry, and each insisted that his pursuit of the sport stemmed from family tradition, and not from his social or financial status, real or imagined.

Members of some 20 Kelibian families practice sparrow hawking each spring. They carry on a town tradition, the origins of which seem lost in a long and complex past. Floor tiles in a Roman villa unearthed in the town in the 1960's show a falcon and trophies of the hunt. And according to



Aleya and Larbi Samoud, above and left, show that a hawk on the wrist can be a suitable part of either Western or traditional dress in Kelibia. This page, left, flying a hawk from a rocky outcrop.

tradition, the *burj*, or citadel, of Kelibia was home to great aficionados of falconry. It was the Ottoman Turks who built the *burj*, atop an earlier Byzantine outpost, in the 16th century, and since the Turks were – and some would say still are – among the most avid falconers in the world, perhaps the local Kelibian passion for birds of prey can be traced to them, if not to earlier inhabitants.

The ontogeny of Kelibian falconry is intriguing because it seems that townspeople and villagers on the rest of the Cap Bon peninsula are not infected by the sport. Larbi Samoud, an active 84-year-old hawker, has lived in Kelibia all his life. He says sparrow hawking is practiced only among people from Kelibia and El Haouaria, towns where Turkish strongholds once stood. "Twelve kilometers [eight miles] to the south in Menzil Temime, or 30 kilometers [19 miles] to the west in Sidi Daoud, no one hunts with the *saf*," says Samoud.

Saf is Tunisian Arabic for sparrow hawk. "In French, it's *épervier*, and in classical Arabic it's *baashaq*," Larbi Samoud told me. The *Saf* resembles the North American Cooper's hawk and the Levant sparrow hawk, found east of Tunisia, but is smaller than either of its cousins. Only a foot long, it has short, rounded wings and a long tail, two body traits that give him great maneuverability. He commonly lives in woods near open fields, and hunts by cruising low over hedges and meadows in search of smaller birds and the occasional rodent. Like other hawks, the female sparrow hawk is larger than the male and makes a more determined hunter.

Eurasian sparrow hawks pair anew each year, nest in Europe in summer, and then, with their young, traverse the 140 kilometers (87 miles) of open sea between Sicily and Cap Bon, arriving in Tunisia in October. Some have traveled long distances by then. Larbi Samoud once trapped a hawk wearing a tag with strange writing on it that turned out to be Cyrillic: The hawk had been banded in the Soviet Union.

In March, the hawks reverse direction, flying far on days when the north wind gives them added lift for soaring. It's in mid-March that Kelibia's falconers descend on the Forest of Darchichou to trap hawks for spring hunting.

Unlike falconers who raid nests to take eyases, or immature hawks, Kelibia's hawkers trap full-grown hawks and train them for only two weeks before hunting them in April and May. They use two methods of capture. In one, nets measuring about 12 meters by four (39 by 13 feet) are erected near trees where hawks are likely to roost. If a hawk flies into the net, it collapses around him. In another, more time-consuming but more reliable method, a blind is constructed behind foliage and a net trap is set up in a clearing. On a clear day with a northerly wind, the trap is baited with a live quail, dove or pigeon. When a cruising hawk approaches, the hunter in the blind jiggles a string tied to the feet of the bait bird, making it move enticingly. If the hawk plunges for the kill, the hunter tugs a separate line to spring the net.

The first objective in training a wild-caught hawk, or haggard, is to get him to feed from the hunter's hand. The Samouds don't wear protective gloves, preferring instead to have direct tactile contact between man and bird. (The obvious results are the scratches that decorate the Samouds' arms and wrists each spring.) Once a hawk has learned to cross a dark room to feed on the fist, the hunter begins to train him in a courtyard. Jesses, small silk and leather straps, are attached to his legs. They trail a light line of two or three meters (6 to 10 feet) to keep the hawk from flying off unexpectedly. Finally, a feather-light brass or silver bell is tied to the base of the hawk's tail to signal his location when he flies into brush or high grass.

Larbi Samoud's son Aleya and his grandnephew Chedli invited me on a hunt using two male haggards they had recently trained. The three – or five – of us set out for El Haouaria; Aleya held Chedli's hawk while his nephew drove. "My *saf* is very high-strung," he said, explaining why his own bird was confined to a cage in the back. "If mine rode in the cab, he'd scratch our eyes out."

While driving through the forest, Aleya sighted a peregrine falcon circling over a dense thicket. As we watched, the falcon stooped Stuka-like toward an invisible target in the brush.

"The *borni* flys high and then plummets suddenly to the earth," said Aleya, using the Tunisian Arabic word for falcon. "But our hawks, we throw them at the quail. You'll see."

In a dive, a falcon can reach speeds above 160 kilometers an hour (100 mph). That ability allows it to capture quarry that can actually outfly the falcon in level flight. The sparrow hawk, on the other hand, relies on surprise, speed and agility to overtake its prey.

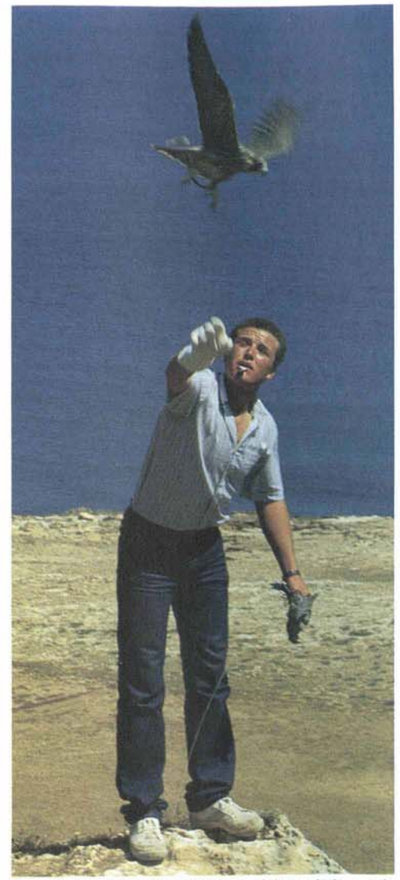
Near the new El Haouaria pumping station for the Algeria-to-Italy natural-gas pipeline, Chedli pulled over on a dirt road. Though heavily cultivated, land in the peninsula is rarely fenced, so hunting access is easy. "Some farmers a few years ago tried to ban hunting in much of Tunisia because they said it damaged their crops," Larbi Samoud had told me. "But the agriculture ministry looked into the situation and determined it didn't hurt the crops, so the ban was lifted."

Aleya breeched his shotgun, inserted two home-loaded cartridges with light charges, and walked off in search of a lark. Young hawks should be fed twice a day, and care must be taken to see that they get enough sand, gravel or bone in their food for proper digestion. Giving the hawks fresh meat – from the hand, of course – just before hunting is thought to stoke their raptorial instincts. But Aleya's powder charges were too light or his aim faulty: After two attempts to bring down the same irate meadowlark, he gave up. "These hawks can hunt hungry," he said.

After an hour we had little to show for our efforts but sore ankles and dusty shoes. Then, as we moved along the edge of a wheat field bordered by a patch of thistles, we flushed a small covey of quail that promptly scattered. First Aleya's bird took one. Then it took another. Then Chedli's hawk made a beautiful strike only three feet above the ground, and tumbled into a scrubby tree with his prize. We found him with the prey clutched in his talons, looking smug as his bell rang softly in the breeze.

Pride is as fleeting as frightened quail, however. On his next turn, Chedli's *saf* was in full-throttle, low-altitude aerial pursuit when it crossed paths with a singularly immobile donkey. The hawk pulled sharply upward, his jesses trailing straight down, and barely avoided the beast's long ears. The donkey didn't budge.

All in all, Aleya and Chedli took eight quail, losing only the one the donkey had blocked for. "If you get four or five, it's a good day," Aleya said, quickly adding that exercise and the joy of being outside were as important as taking home the makings of a feast.



Opposite, top: Retrieving Aleya's quail; lower, light metal bell in the hawk's tail coverts. Above, javelin-thrower's motion launches hawk after prey. Below, Accipiter nisus.

"Fifteen years ago, two men and two hawks could go out and get 80 quail in a day if they wanted," said Larbi Samoud when we returned. "But today there aren't many game birds left, and there are fewer hawks, too." Population pressure has reduced the numbers of wildlife species in all of Tunisia. As more land is brought under cultivation, as more roads are built and as more cars roll on them, the natural habitat for game disappears. Worse, a growing threat exists from pesticides and herbicides. When toxic chemicals enter the food chain, it's the larger animals higher on the chain, like quail and hawks, that cumulate the poisons and suffer most.

Larbi Samoud, a poet as well as a falconer, likes to tell the story of 'Am 'Ali ben Nar, who so loved his *saf* that he kept and hunted it year after year, until finally the bird died at age 33. But 'Am 'Ali still couldn't give up his hawk, so he placed it lovingly in a lacquered box and buried it with honor in a wall of his house. Years later, a perplexed descendant, doubtless thinking of treasure, found the hawk's coffin during a remodeling.

Scientists estimate that the normal life span of a hawk in the wild is only three years. In captivity, small falcons and hawks rarely live longer than a dozen years, even under favorable conditions, so the story of 'Am 'Ali ben Nar, like many, most, or all hunting stories, contains a healthy dash of exaggeration.

Nevertheless, the story shows how strong the attachment between a Kelibian falconer and his hawk can become, just as the telling of the story – over cups of tea and an exchange of cigarettes in a small sidewalk cafe – shows how the man-bird relationship engenders a broader one among hunters themselves. In Kelibia, that broader relationship doesn't require a country club membership nor the formalities of, say, tee times and score cards to reach fruition. In the end, falconry – perhaps all hunting – is a cultural act more than a sport.

Given the strong bond between man and bird, at least as perceived by men, it makes sense to expect that most Kelibian falconers would follow 'Am 'Ali's example and keep their hawks several years.

Sensible, perhaps, but incorrect. Each spring, once the quail are few, the wheat is cut, the days get hotter, and the hunters start remembering all the mundane tasks they've put off for two months, they take their hawks out to the little Forest of Darchichou one last time, untie their jesses and bells, and release them to the north wind.

John M. McDougal, who holds degrees in Middle Eastern studies and journalism, writes on France and North Africa and is a contributing editor of Cairo Today.

WRITTEN BY JOHN LAWTON
PHOTOGRAPHED BY TOR EIGELAND

SECRETS OF THE SANDS

Using state-of-the-art technology (left) and an old desert travelers' trick (above), a scientist monitors sand-dune movement in the Wahiba Sands.

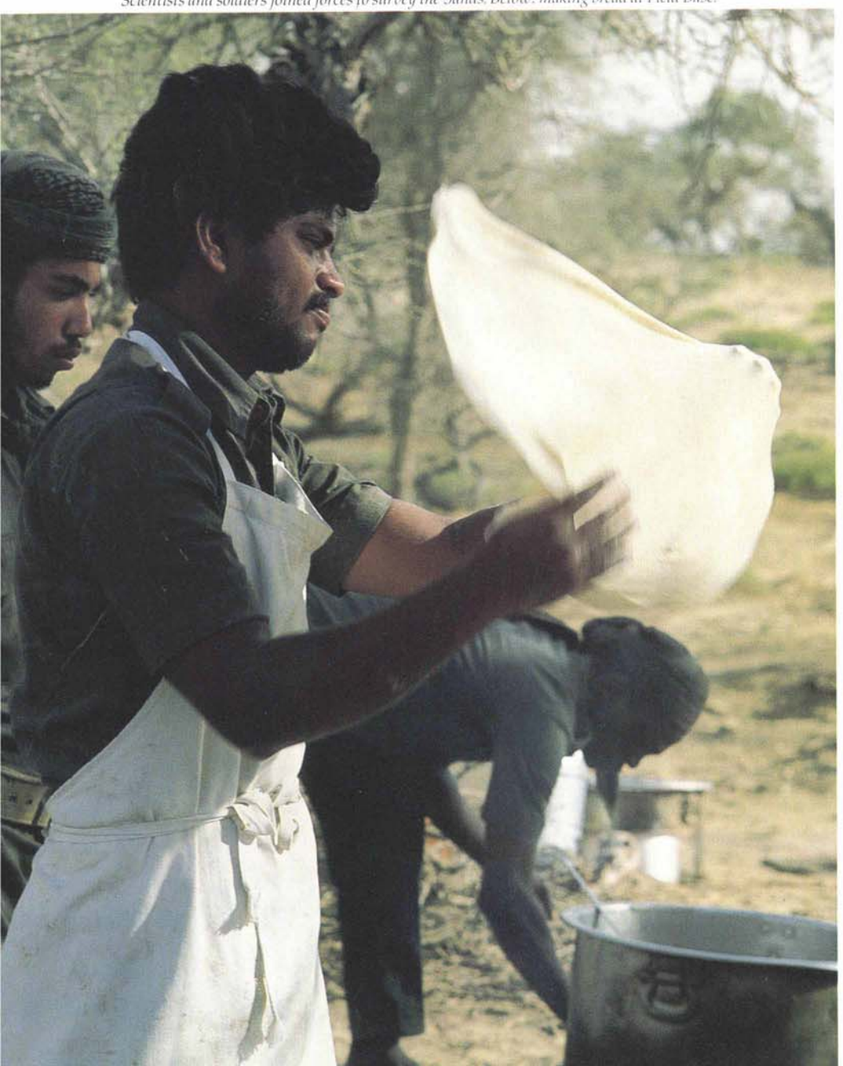
At first glance, it looked like a touch too much of the sun.

First, Captain Bill Rudd of the Sultan of Oman's Armed Forces half-buried four old truck tires in the sand. Then he doused them with gasoline and set them on fire. Next, Nigel Winser of Britain's Royal Geographical Society began chanting, "One, two, *three*!" at the top of his voice. And at each shout of "*three*," two scientists simultaneously photographed the windblown stream of oily smoke as it swirled and eddied over the crest of a nearby dune.

"The forefront of science," said Rebecca Ridley, the expedition's education officer, with a grin.

And so it was.

Scientists and soldiers joined forces to survey the Sands. Below: making bread at Field Base.



The scientists were actually developing an easy, alternative method of monitoring and recording sand movement: The thick, black smoke showed clearly the flow of the invisible wind and its burden of near-invisible sand particles, and gave the scientists a clearer view of how the wind builds and shapes dunes. And although it had been done before using smoke grenades, the "Rudd method," as it was dubbed, was cheaper and more practical: Grenades are expensive and a problem to carry around in the security-conscious 1980's, while discarded tires can be had locally for free.

Burning tires to attract attention in an emergency is, in fact, an old desert travelers' trick. So why didn't science adopt it earlier? Because, the scientists said, despite much debate in recent years about the growth of deserts and the problem of desertification of formerly fertile land, very little scientific research about deserts has actually been-done.

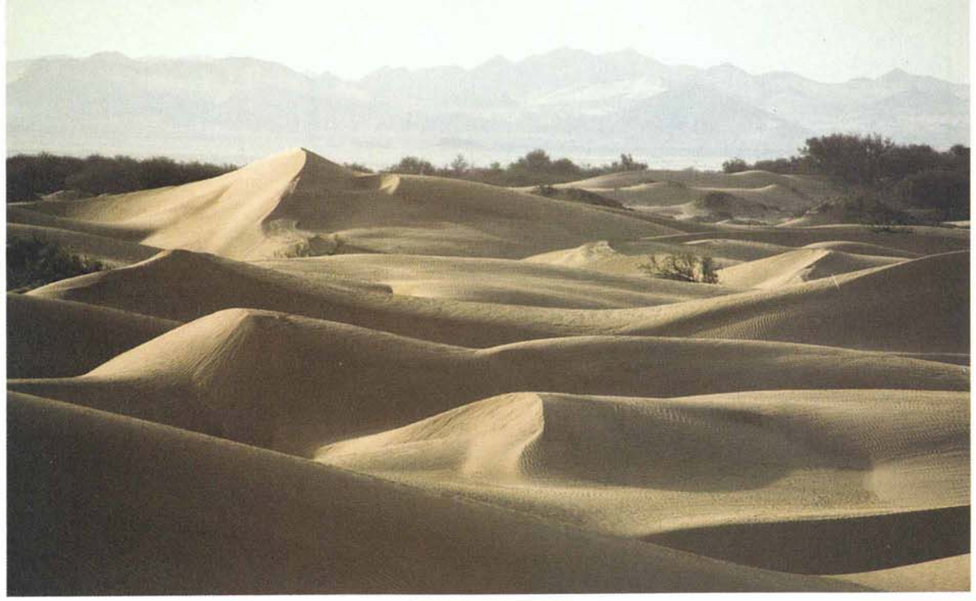
It was with this in mind that the Royal Geographical Society (RGS), which previously had focused on rain forests in Sarawak, mountains in Pakistan and rangeland in Kenya, decided to turn its attention to desert, and launched an expedition to the Wahiba Sands in the Sultanate of Oman.

It was the most intensive desert study ever conducted. Between December 1985 and April 1986, the expedition carried out a total of 32 research projects in the fields of earth, life and human sciences and in the water economy of the desert.

The projects involved over 30 scientists, seconded from British universities and research organizations, and hundreds of support personnel, including administrative volunteers, military "babysitters," commercial sponsors, a prince and a sultan. A significant contribution to the knowledge of the Sands was also made by its Bedouin inhabitants.

The results of this unusual partnership, says the RGS, included "many new scientific secrets" ranging from the dew-drinking beetle to the largest aeolianite (fossilized sand) beds in the world. The expedition also disclosed the economic importance of the *ghaf* tree (*Prosopis cineraria*) in reforestation of arid areas, uncovered the potential of the Sands in reconstructing the environmental history of Arabia, and established new theories of dune formation. In addition, said Amer 'Ali Omair, vice-chancellor of Sultan Qaboos University, it unraveled "some of the complex interacting factors which affect sand movement."

This virtual encyclopedia of survey data establishes a baseline – a scientific basis for comparison – in all future desert research, and makes the Wahiba Sands a valuable scientific resource in themselves. The Omani government is considering declaring the Sands a national conservation reserve as a living laboratory for the future benefit of science.



Wave-like dunes are one of the varying landscapes of the Wahiba Sands.

But why, with bigger and better-known deserts to choose from – the Sahara, for example, or Arabia's vast Rub' al-Khali – single out an obscure corner of Oman for special study? Because, says Winser, the RGS expedition officer, Wahiba is "a perfect 'hand specimen' of a sand sea."

It is small as deserts go – only 12,000 square kilometers (4,650 square miles) – yet contains an extraordinary variety of dune forms. It is well defined – bounded by mountains and the sea – and only three hours' drive from Muscat, the Omani capital. And this compactness and accessibility reduce the logistical difficulties of field research.

It is, says Winser, "as if the Sahara and the Rub' al-Khali had been compressed into one small unit. No other body of sand in the world contains such a full range of sandy terrains, or has so much to offer scientists urgently trying to piece together the complex jigsaw of arid-zone areas."

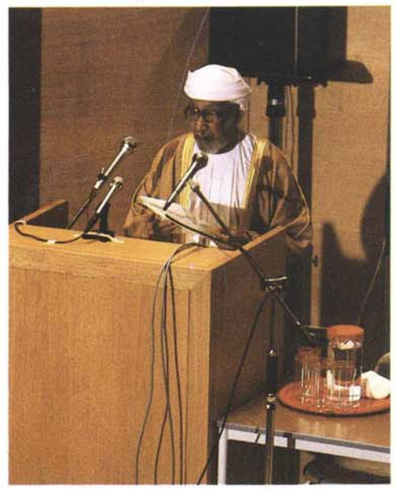
Of all the world's deserts, for example, Wahiba probably contains the best evidence of environmental changes over the last few tens of thousands of years. There are also significant traces of human occupation in neolithic times.

The Sands also contain an ancient relict woodland – an ecological left-over – of drought-resistant *Prosopis cineraria* which, besides being of biological and historical interest, has potential economic uses in other sand seas.

Another important reason for choosing the Wahiba Sands for the RGS research project, however, was Oman's exemplary environmental policy.

The sultanate was one of the first countries in the world to establish a ministry of the environment, to ensure that its dramatic, 15-year transformation from a medieval to a modern state (See *Aramco World*, May-June 1983) did not bring ecological destruction with the modernization.

"The impact of development," said Sultan Qaboos bin Sa'id, "must be skillfully directed so that our woodlands are not destroyed, our soils are not eroded and our valuable species of plants and animals are not prevented from playing their vital role in maintaining the environment."



'Ali Omair, of Sultan Qaboos University.

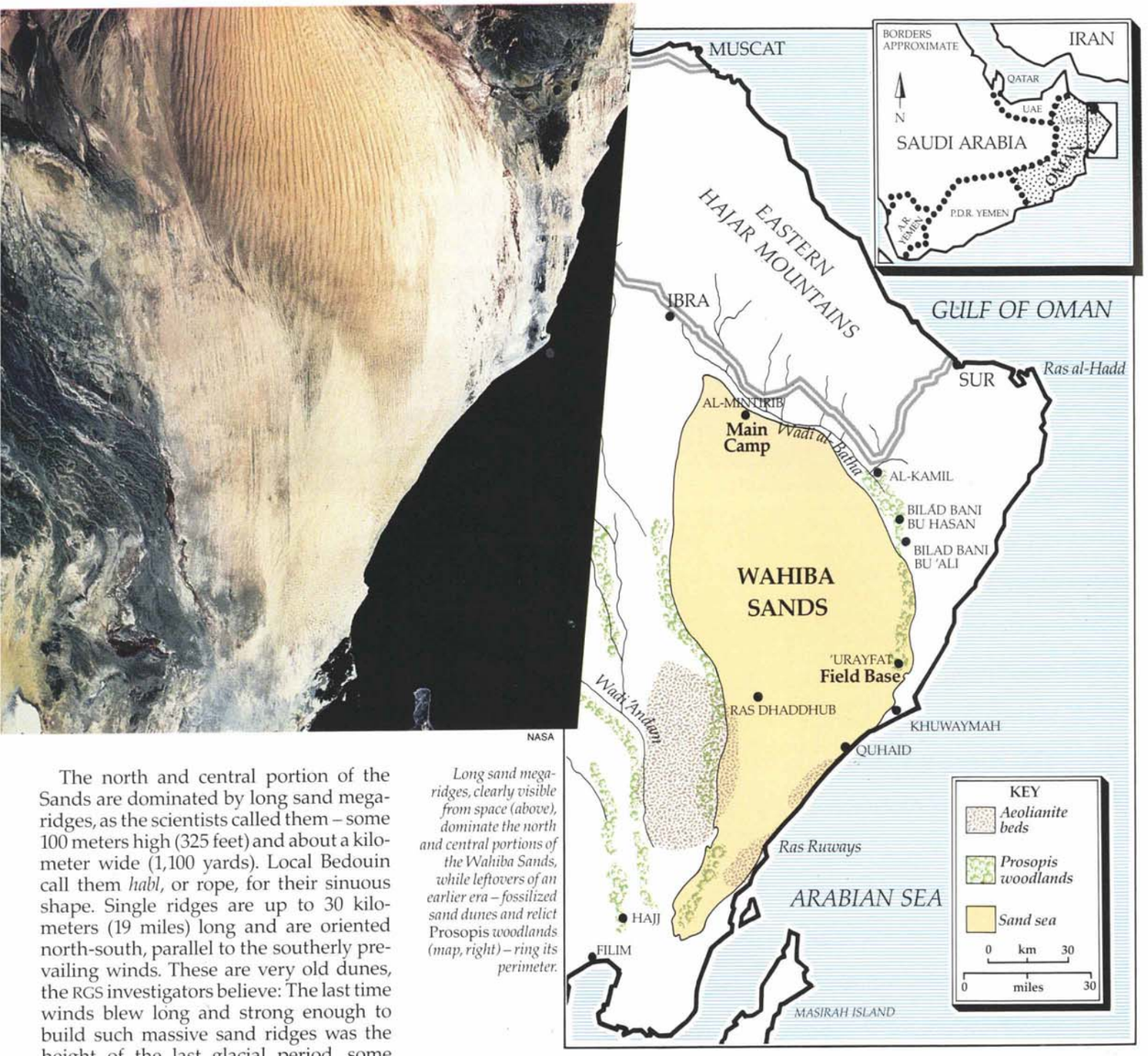
The sultanate also played a pivotal role in the successful reintroduction of zoo-bred Arabian oryx (*Oryx leucoryx*) to the wild – where they had been hunted to extinction – by guaranteeing the threatened species sanctuary on Oman's Jiddat al-Harasis plain (See *Aramco World*, July-August 1982).

The Royal Geographical Society too was given a warm welcome. "No other expedition," says Winser, "has ever been so well supported."

Backed by the state, sponsored by business and looked after by the Omani Armed Forces, the RGS was able to complete in three weeks reconnaissance that under other circumstances would have taken three months, and performed a year's worth of field work in four months. Indeed, said RGS patron Prince Michael of Kent, "I know our expedition officer dreams of borrowing a unit of Omani soldiers to help with future projects."

The expedition got its first good look at Wahiba in January 1985, when an eight-man multi-disciplinary team spent three days overflying the Sands, another three days helicopter-hopping to specific locations in it, and then ground through more than 6,000 kilometers (3,700 miles) of dunes in four-wheel drive. Additionally, the United States provided satellite imagery from Landsat's thematic mapper.

The Wahiba Sands lie in the eastern corner of Oman, between the Hajar Mountains in the north and the Arabian Sea in the south and east. To the west are boulder-strewn gravel plains extending to the Rub' al-Khali desert and the Saudi Arabian border.



NASA

Long sand mega-ridges, clearly visible from space (above), dominate the north and central portions of the Wahiba Sands, while leftovers of an earlier era – fossilized sand dunes and relict Prosopis *woodlands (map, right) – ring its perimeter.*

The north and central portion of the Sands are dominated by long sand mega-ridges, as the scientists called them – some 100 meters high (325 feet) and about a kilometer wide (1,100 yards). Local Bedouin call them *habl*, or rope, for their sinuous shape. Single ridges are up to 30 kilometers (19 miles) long and are oriented north-south, parallel to the southerly prevailing winds. These are very old dunes, the RGS investigators believe: The last time winds blew long and strong enough to build such massive sand ridges was the height of the last glacial period, some 20,000 years ago. The dunes' red color comes from an iron-oxide coating on the sand grains that takes many centuries to form.

By contrast, the sand in the southern Wahiba is light yellow, sometimes almost white, in color. Near the coast it is piled into large linear dunes, oriented east-west, with loose slopes up to 80 meters (260 feet) high. These dunes are the result of contemporary sand movement from the shore, and are actively growing today.

Besides the mega-ridges and coastal linear dunes, there are also curved and crescent-shaped transverse dunes in the Wahiba Sands and, overlapping the larger dunes, smaller ones of many other shapes and sizes. The effect is wave-like – which is why it is called "sand sea."

Beneath the loose sands of the modern dunes lies a vast rock shelf of fossilized ancient dunes. The rock appears as cliffs on the coast and as escarpments in the west, and also forms the floors of some of the deep valleys, or swales, between the dunes. Remains of ancient streams, in the form of raised wadi channels, are also evident on the Sands' western perimeter.

The northern boundary of Wahiba, where intermittent flooding of Wadi Batha gnaws at the edge of the Sands, is very abrupt. Here mega-ridges plunge precipitously to the floor of the valley, whose floodwaters wash away accumulated sand and prevent the desert from encroaching on the chain of fertile oases along the Sands' northern rim.

Prosopis woodlands, in whose shade the Bedouins pitch their tents, grow along the eastern and western margins of the Sands. The southern coastline stretches about 100 kilometers (62 miles). There is no road: The beach serves at low tide to link palm-frond fishing villages that are tucked away among the dunes to escape the ever-blowing inshore wind.

The mapping and sampling of the Sands was followed in December 1985 by a four-month intensive study of its orgin, ecology, conservation and development by the full RGS research team.

View from Field Base: Prosopis *woodlands, salt flats and Jabal Ja'alan.*

This study combined the traditional approaches to field work with modern technological aids, and was run with the precision of a military campaign.

The team operated from a main camp at al-Mintirib, an oasis town on the highway skirting the northern perimeter of Wahiba, and from a fixed field base and various mobile bases in the Sands themselves. All bases were staffed and supported by the Sultan of Oman's Armed Forces.

Main camp at al-Mintirib was a modern research base of portable buildings with accommodations for 40 people. Facilities included an air-conditioned computer room, a laboratory, print shop and library. The camp also served as the expedition's tactical headquarters, supporting and supplying team members in the field and coordinating their activities by radio.

Field base was a permanent tent camp at Qarhat Muammar in the eastern margin of the Sands. It included a mobile laboratory on loan from Sultan Qaboos University and a meteorological station.

Mobile bases operated from Land-Rovers for two to three weeks at a time. They had limited scientific facilities and fewer comforts, but they did allow the scientists, once they had mastered the art of driving in soft sand, to range freely over the Wahiba. By the time they had finished, says Winser, "very little of the desert remained unstudied."

The scientists concentrated on five study areas: the formation and history of the Sands, modern sand movement, biological resources, economic interrelationships among the area's human inhabitants, and the impact of recent change.

The Sands, the investigators found, have a complex history. For earth scientists, they represent a unique record of the development of a sand sea.

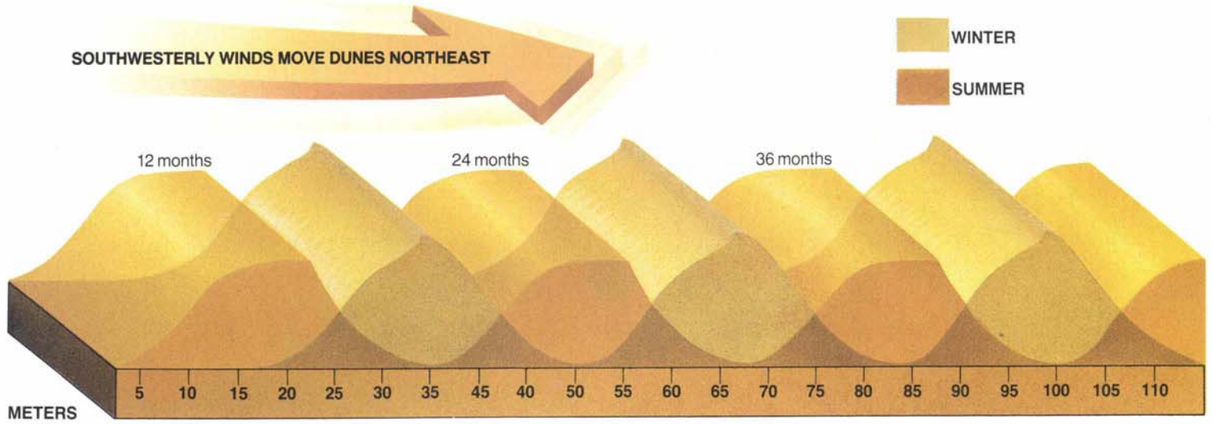
About a million years ago, during a dry glacial period when the sea level was much lower, sand blew inland from the exposed sea bed to form the first of a succession of sand seas at Wahiba. Most sand deserts are composed mainly of silicate mineral grains and rock fragments, but Wahiba's early dunes contained mainly calcium carbonate and magnesium carbonate particles, derived from the shells of marine animals or precipitated from seawater by marine algae. When the sea level rose again during a later, wetter interglacial period, those carbonate particles dissolved, cementing the ancient dunes together into a stone called aeolianite and preserving evidence of their formation.

The cemented dunes were then planed off by strong winds during another dry period, and the sand produced by this erosion blew further inland to form the mega-ridges that dominate the central and northern portions of the Sands today. Later, more sand blew in from the beach, forming a new layer of dunes along the coast on top of the remains of the ancient, planed-off ones.

At least three distinct cycles of dune formation, cementation and subsequent wind erosion were recorded by the scientists in Wahiba's stratigraphy.

Three stranded shorelines, marking sea levels of the past, were also discovered. The highest of these lies 30 meters (100 feet) above today's estimated mean sea level. The longest stretch of ancient shoreline, covering more than 50 kilometers (30 miles) near Khuwaymah, was 11 to 13 meters (36-42 feet) above mean sea level; radiocarbon dating showed it to be a minimum of 20,000 years old. The lowest stranded shoreline – 1.5 to 2 meters (60-78 inches) above mean sea level – probably dates from the middle of the Holocene Epoch, which runs from 10,000 years ago to the present.

The swales between the mega-ridges apparently held seasonal lakes during the early- to mid-Holocene period: Investigators found the remains of snail-like lake-dwelling creatures there and subjected them to radiocarbon dating. Dr. Rita Gardner of King's College, London, says the results "suggest a late Pleistocene age for the mega-ridges, and an even earlier age for the aeolianite." The Pleistocene Epoch dates from 1.6 million to 10,000 years ago.



Strong southwesterly winds from March to July produce a slow, cumulative dune movement of a few meters a year, RGS scientists found, along with a distinct seasonal change in dune shapes.

The Wahiba is probably the largest Pleistocene aeolianite field in the world. Because the sand it comprises must be carried by the wind, aeolianite seldom reaches more than 20 kilometers (12 miles) inland from the coast, but the Wahiba aeolianite extends more than 100 kilometers (62 miles) inland and at least three kilometers (3,250 yards) offshore. "As such," says Dr. Gardner, "it is the most extensive continuous deposit so far identified in the world."

The aeolianite field has been extensively eroded and planed off. On the coast north of Ras Ruways, it is cut by the sea into cliffs up to 20 meters (65 feet) high. But the most spectacular outcrops occur in the swales between the coastal dunes, where strong inshore winds have eroded the rock into weird shapes.

As landforms, however, the raised stream channels along the western perimeter of the Sands are even stranger: miles of sinuous ridges that, from the air, stand out black against the bright sand.

These gravel outcrops are the beds of ancient rivers that flowed across the plain west of Wahiba in much wetter times, and whose beds, like the aeolianite, were preserved by cementation. Dry glacial-period winds then removed the finer material from around these coarser deposits, leaving them exposed, the skeletons of dead streams.

Later, river erosion by Wadi 'Andam, which today cuts a much straighter path across the plain, dissected the meandering ridges, revealing excellent evidence of climate change.

"These systems," says Dr. Paul Munton, the expedition's biological resources program director, "are a unique record of the alternation of wet and dry periods over the last few tens of thousands of years." As such, he adds, they offer great potential in reconstructing the environmental history of the Arabian Peninsula.

In its study of modern sand movement at Wahiba, the RGS desert research team examined the dynamics of three active dune fields: a kilometer-square (250-acre) plot of mega-dunes near Quhaid on the coast, a 100- by 50-meter site (330 by 165 feet) in low dunes at Ras Dhaddhub, and a 200-square-meter plot (2,150 square feet) in a dune network at 'Urayfat, in the Sands' eastern margin.

Two of these dune fields were surveyed three times, months apart, to record changing dune shapes; the results were digitized for computer analysis. Additionally, a smaller area at 'Urayfat was observed with repeated low-distortion photography, and the investigators made very detailed observations of changing dune forms by studying certain dunes with graduated poles: They recorded changing sand heights on the poles at short intervals. And observations of wind flow over individual ridges were also made, using the "Rudd method."

All this produced a mass of data; in preliminary analysis, it shows that the dunes are very mobile. During the January-to-March period, changeable winds produced erratic movement – upper parts of ridges moved back and forth – but no major change in overall shape or structure. During the March-to-July period, in strong, southwesterly winds, however, the dunes' main slipfaces shifted northeastward, and their overall shape changed as well. The wind excavated the hollows between them and built some of the summits higher. More generally, the dunes became broader, with flatter summits.

These results, says Dr. Andrew Warren, director of the expedition's earth sciences program, "seem to call for a revision of some models of dune formation."

Indeed, claims Warren, the sand dune has been much maligned during debate on the problems of desertification. Although generally depicted as marching inexorably out of the desert to bury fertile land, dunes, he says, move mainly within sand seas. They rarely encroach on adjoining land unless it has been degraded by overgrazing, deforestation or other human intervention.

A study by three other Royal Geographical Society scientists at Wahiba supports this view. The trio carried out a survey of land systems and sand hazards at the Badiyal Oasis, on the northern fringe of the Sands. A report by the United Nations Environmental Program (UNEP) had asserted that sand encroachment was responsible for desertification of the oasis. But although more work is needed before their findings become a basis for policy, the RGS scientists say that "doubt is thrown on the UNEP conclusions," for "many [agricultural] fields are abandoned before rather than after burial by sand."

"I am not saying there is no problem," said Warren, "but one of the big difficulties is diagnosis. Dune management is very hit-or-miss. We need to find out what makes dunes tick; only then will we find a better way of controlling them. Now we try to command them; we should be trying to understand them."

Meanwhile, the expedition's biological resources survey of the Sands may have pin-pointed part of a solution of the problem of desertification: *Prosopis cineraria*, a drought-resistant, acacia-like tree that forms woodland biotopes in the western and eastern margins of the Sands.

The Wahiba *Prosopis* stands turn out to be vital to both the human and non-human residents of the Sands. During long dry periods, when much of the ground vegetation is dormant, these trees maintain lush canopies of leaves and are often heavy with flower and fruit.

For the 3,000 Bedouins who live in the sand sea, the *Prosopis* trees, which they call *ghaf*, provide shade, wood for cooking, timber for shelters, food in the form of edible leaves and fruit, and fodder for their camels and goats – which in turn supply milk, butter, cheese and meat.

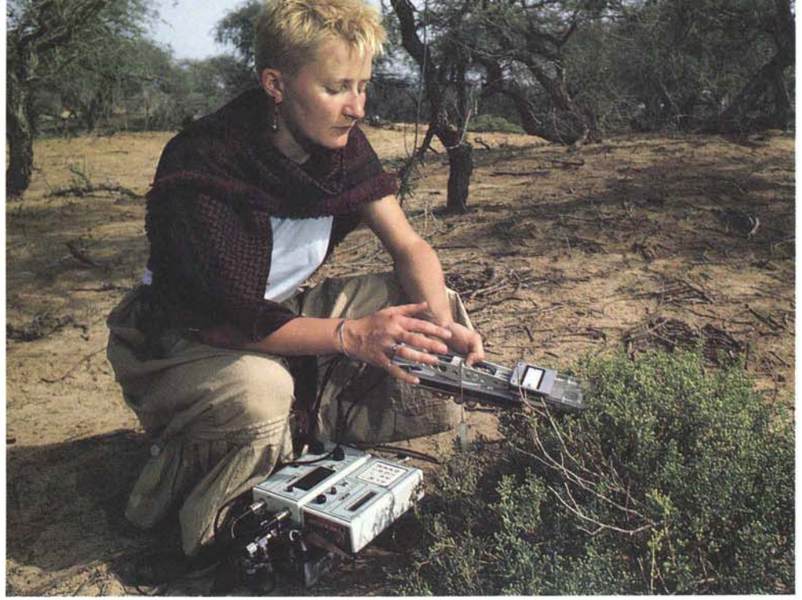
The woodlands also support large populations of insects that either feed on the trees or use them as shelter or habitat. The insects provide food for reptiles, birds and small mammals, on which, in turn, wild cats and desert foxes prey. And, because of the concentration of domestic and wild animals, the ground under the trees is well fertilized and produces rich undergrowth for grazing after occasional heavy rains. "This species," says Kevin Brown of Durham University, "is ideally suited for the reforestation of arid areas."

The survival of *Prosopis cineraria* in the harsh environmental conditions of the Sands – fierce temperatures, searing winds and high rates of water loss – depends mainly on tapping permanent underground water reservoirs: The taproots of mature trees can penetrate as deep as 30 meters (100 feet). Another survival factor is the tree's ability to propagate itself by producing new shoots from parent root systems, rather than depending on risky, biologically expensive regeneration from seed. *Prosopis* can also "absorb moisture from dew and mist carried in from the Arabian Sea," says Brown.

Dew – sometimes the equivalent of half a millimeter of rainfall (.02 inch) in a single night – is also a vital factor in the survival of many other life forms in the Sands. "At certain places and time of year," says Vice-Chancellor Omair, "dew and mist yield enough precipitation to support lichens and some invertebrates, such as dew beetles. There is enough dew, perhaps, to form a significant part of the water needs of larger animals, including gazelle."

Ancient fossilized sand dunes appear as rock outcrops in the valleys between modern sand dunes.

Moisture from the Arabian Sea, condensed as dew, waters Wahiba's vegetation (right), which in turn supports a large population of insects and reptiles, such as the dwarf rock gekko (left).



Sophie Laurie of University College, London, measuring the temperature of plants.

It has long been known that the gazelle gets its water partly from life-giving droplets of dew that form on vegetation overnight, and that the dew that drips from plant leaves onto the sand waters the plants themselves.

But tiny mounds and trenches found by the RGS research team along the crest of many of Wahiba's dunes led to rare observations of five species of nocturnal dew-drinking Tenebrionid beetles – three of them new to science.

The beetle's home is about ten-to-20 centimeters (4-8 inches) below the surface of the sand. When dew has formed a wet crust, the beetle burrows up to the crest of the dune and drinks the free water held by capillary action between the loose sand grains of the mounds, or gathered in the trenches it has constructed. As the sun rises and the dew dries up, the beetle burrows down again into the cooler layer of sand below.

The most noticeable plant in the Sands, *Calligonum comosum*, grows best atop dunes of conical shape; it apparently owes its survival partly to its ability to absorb dew through its leaves. These plants remain green for long periods without rain and make excellent forage, contributing, says Dr. Paul Mounton, "to the success of local people in raising racing camels."

Other plants lie dormant during long dry periods – springing back to life when it rains, compressing into hours or days a whole life cycle of germination, growth, flowering, seed formation and death. During that short time, the plants literally turn parts of the desert green.

In the past, the Bedouin of the Wahiba Sands sought to maintain a balance between their needs and nature's gifts through self-imposed bans on tree felling and the creation of temporary grazing reserves. Now, says Roger Webster, the expedition's human-studies program director, there are signs that these practices are weakening.

Bounded by the Arabian Sea, the shores of the Wahiba Sands attract a wide variety of seabirds.

Traditionally, when an area was declared *musawwan* (reserved), all camps and small livestock were removed from the vicinity for about two months to allow vegetation to recover and develop.

"But now that they are no longer dependant on the Sands for their resources," says Dr. Tom Gabriel of Cardiff University, "they are neglecting them." Today, for example, at least one member of each family goes off to work in the army or the oil fields, sending back money to buy food and fodder. And new wells have increased water extraction in the woodlands – lowering groundwater levels and threatening the *Prosopis* trees.

Modernization is threatening the rangelands, too: Bedouins are settling permanently, with their livestock, within reach of clinics and schools, giving local grazing no chance to regenerate.

Although a few families remain in scattered camps within the Sands throughout the year, most of its inhabitants live along the Wahiba's perimeter: pastoralists in the *Prosopis* woodlands along the Sand's western and eastern margins, fishermen on its southern coast, and farmers in the oases in the north.

Some 450 or 500 Bedouin families live most of the year in the woodlands, moving their livestock to fresh grazing within the Sands after winter rains. The largest and most widespread tribe is the Al Wahibah. Others include the 'Amr, Hikman, Al Bu-'Isa and sections of the Janaba tribe; each tribe is associated with a particular subregion of the Sands that includes wells and summer and winter grazing.

These tribes also look to particular settlements on the edges of the Sands as "their" administrative and market centers. And it is in these centers that they are now agglomerating. As one Bedouin said, camped in the *Prosopis* woodlands near Bilad Bani Bu 'Ali, "How can I take my children to school each morning if I am living in the middle of the Wahiba Sands?"

In contrast, the fisherman of the Wahiba's coastal strip, says Scottish anthropologist William Lancaster, "seem to prefer their retiring way of life."

Economically, he says, they depend entirely on fishing – mostly sand shark, sardines, kingfish and barracuda – with almost no one employed beyond the community. Fishing is so profitable, in fact, that most men need do it only part-time. They can pay cash for new boats and trucks without resorting to government aid, and still have enough money left to take care of their community's needy.

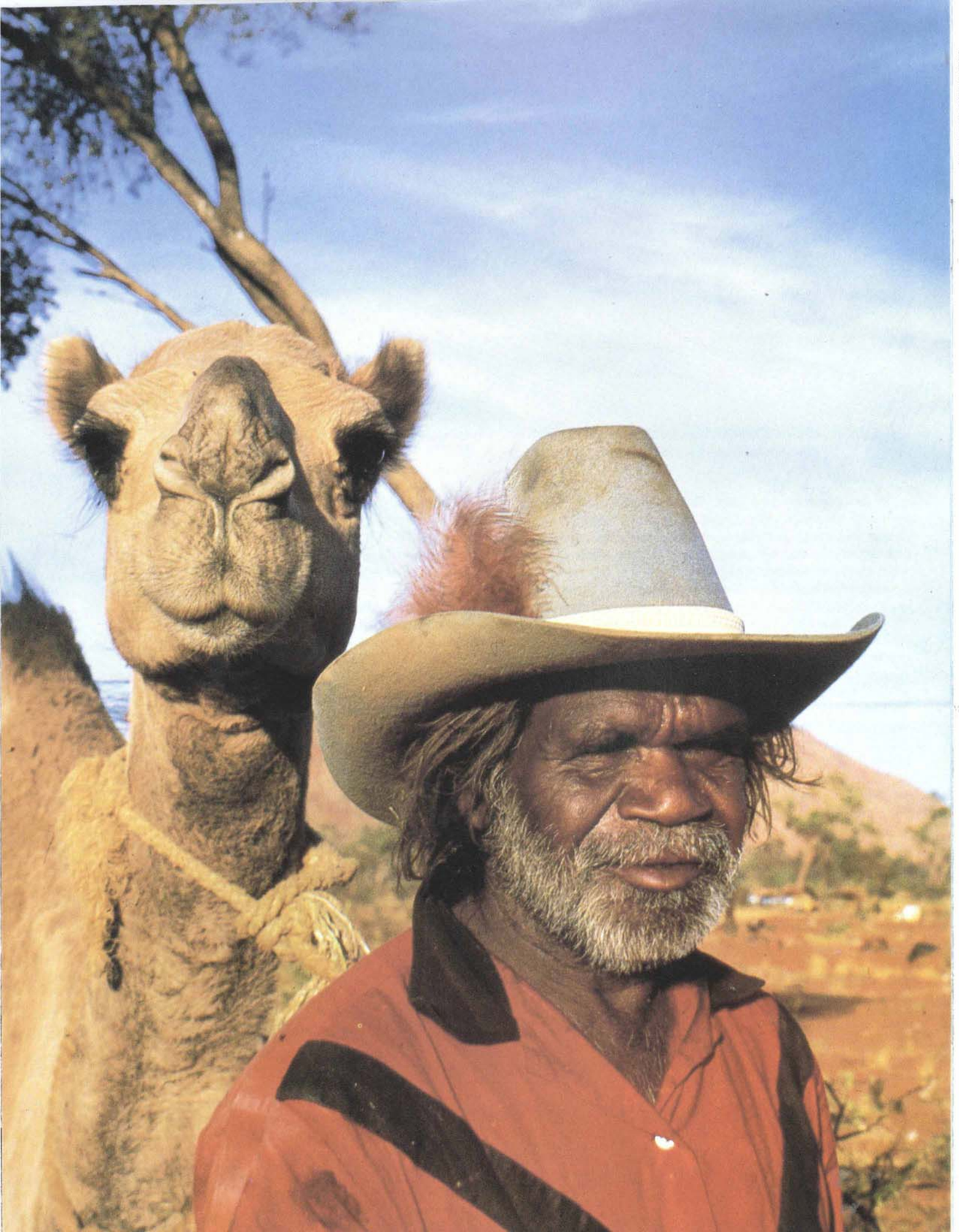
So, the RGS asks in one of its Wahiba-project publications, "What need have they for change?"

Indeed, the policy of the Omani government is to discourage people living in rural regions from moving into urban areas. But the government is not blind to the pull that urban amenities provide.

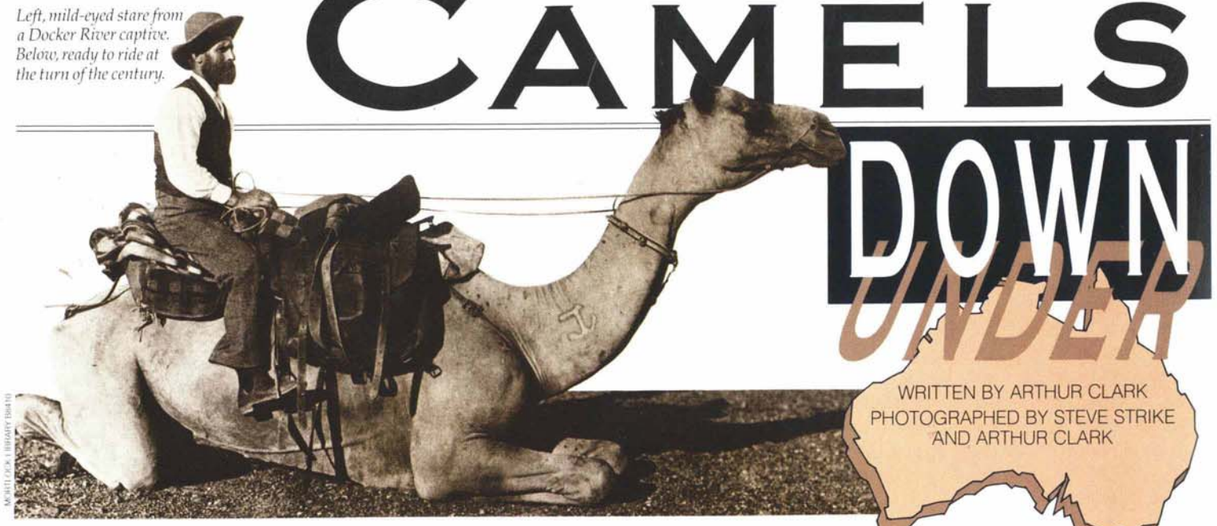
"Development in Oman is bound, sooner or later, to have its impact on the Wahiba Sands," Vice-Chancellor Omair told a symposium at Sultan Qaboos University, held last April to discuss the RGS survey project. "I hope," he said, "the studies made will help to find suitable solutions which will make living standards in the Sands attractive enough for the tribes to remain."

The RGS, however, expects much more. "It is hoped," says Winser, "that Omani and international scientists will work closely together to unravel further secrets of this remarkable area. That will contribute to the growing pool of knowledge about the arid regions of the world."

John Lawton, a contributing editor of Aramco World, *joined the RGS team in the Wahiba Sands last year.*



Left, mild-eyed stare from a Docker River captive. Below, ready to ride at the turn of the century.



CAMELS DOWN UNDER

WRITTEN BY ARTHUR CLARK
PHOTOGRAPHED BY STEVE STRIKE AND ARTHUR CLARK

In central Australia today, you can "take a camel to dinner," and have a meal at a vineyard-bordered chateau after a two-hour ride. Or race a camel around a 400-meter (quarter-mile) track against international competition. Or buy 100 camels – or 1,000 – from outback entrepreneurs, including Aborigines, whose derring-do outdoes Crocodile Dundee.

In Australia? You bet.

The one-humped dromedaries, roving in the only wild herds of their kind in the world and reckoned to number between 43,000 and 60,000, are descendants of camels imported into Australia, beginning in the mid-1800's, to help lay the foundations of the nation. Shipments came largely from the Indian subcontinent, but animals were also landed from Muscat, Yemen, Iraq and the Canary Islands.

Arriving in a trickle that swelled to a flood by the early 20th century, the camels were often guided and cared for by Muslim cameleers. Handlers came from lands as far away as Egypt, Turkey and Persia, though most – with their camels – hailed from northern India and what today is Pakistan. But the men were all, almost always incorrectly, called Afghans or simply "Ghans."

The name stuck to a section of the 2,900-kilometer (1,800-mile) transcontinental Central Australian Railroad linking Port Augusta in the south to Darwin in the north. Camels hauled material and supplies to the men building that line beginning in 1879, and the segment of track from Port Augusta to Alice Springs was called "The Ghan" until it was relaid about a decade ago.

In fact, it could be argued that the town of Alice Springs owes its existence to the hardy camel and the equally hardy cameleers. It was founded in the early 1870's as a repeater station for the Darwin-to-Adelaide Overland Telegraph Line – which was also built by men who depended on dromedaries for supplies and equipment. Plodding camels not only helped establish "The Alice," they brought it civilization – or at least music. The first piano arrived in the 1880's, the story goes, strapped to the back of a camel.

Aptly, the city holds a state legislative district, a primary school and a major thoroughfare all named after cameleer Saleh "Charlie" Sadadeen, who came to Alice Springs with his team in 1890. "Children were enthralled with his distinctive, flowing robes and intrigued with the long-stemmed pipe he smoked," reports the Alice Springs *Centralian Advocate.*

Men like Sadadeen came to Australia on two- to three-year contracts but often lived out their lives in the country, writes American geographer Tom McKnight in *The Camel in Australia.* While a handful became wealthy, deploying "thousands of camels organized into the backbone of corporate business," most toiled from dawn to well past dusk for low pay, and lived near outback towns in little communities distinguished by the "tin minarets of their hastily constructed mosques."

Wherever the cameleers settled, writes McKnight, "they would soon construct a place of worship. In every case the mosque was a focal point of community life in Ghan Town."

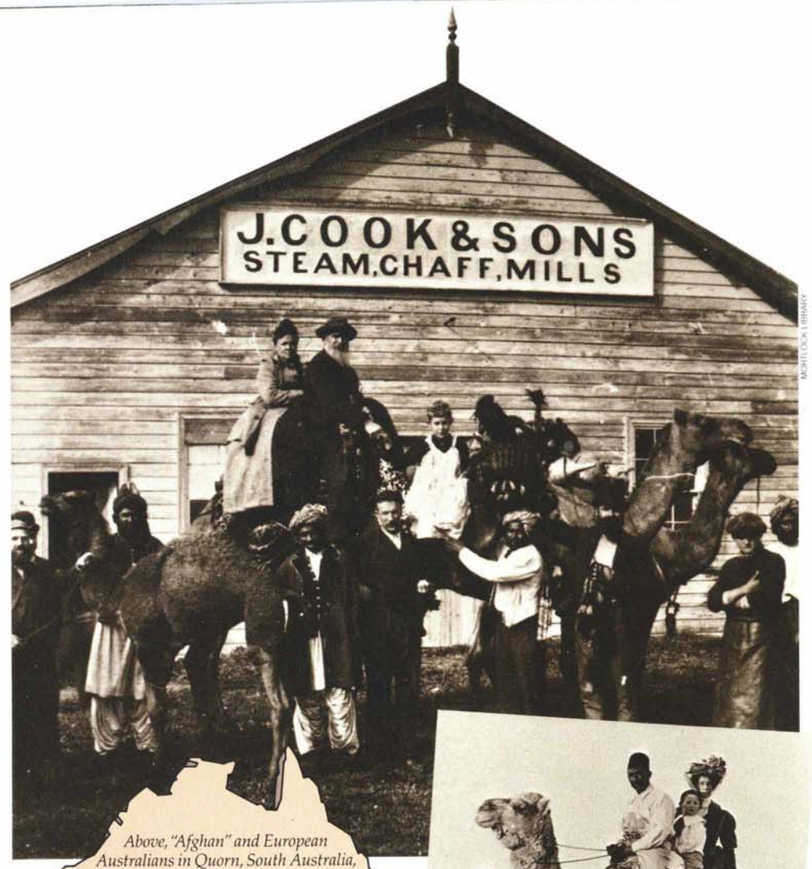
Australians first heard about camels in 1837, just 49 years after Europeans arrived on the continent, when the governor of New South Wales received a report recommending the importation of camels from India to Sydney. The *Sydney Herald* (today's *Sydney Morning Herald*) took up the call, arguing that camels were "admirably adapted to the climate and soil" of the unexplored country.

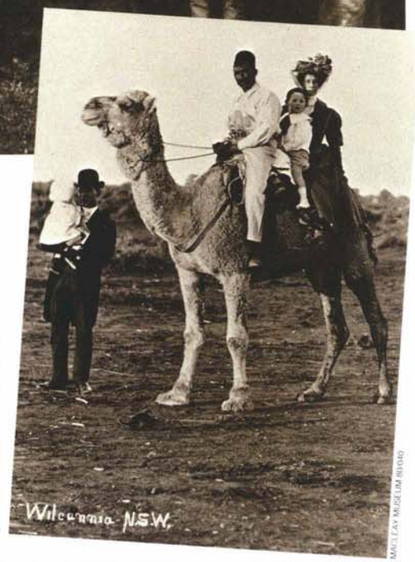
Though it wasn't until the 1860's that dromedaries were brought Down Under in any numbers, the first camel – named Harry – arrived in 1840, the sole survivor of a group of four loaded aboard ship at Tenerife in the Canary Islands. And though they would soon prove vital to the country's development, their first representative hardly set a good example.

On a surveying expedition to the Lake Torrens area of South Australia in 1846, Harry bit the tentkeeper, grabbed a goat by the back of the neck and "chewed a hole in a bag of flour, leaving a white trail along the route," according to an account of the journey. But the straw that broke Harry's back came when he bumped his owner, John Horrocks, just as Horrocks was loading his rifle.

Horrocks lost two fingers and several teeth in the ensuing blast, and died a month later of gangrene. The camel was executed at his express wish.

In May 1841, between Harry's arrival and his premature departure, two female camels acquired from the Imam of Muscat arrived in Sydney via India – the fourth and fifth dromedaries to reach Australia. (The third and fourth were landed in Hobart, Tasmania, from Tenerife, but there is no record of what happened to them.) A male companion from Muscat had died en route. Seeking buyers, the animals' importer shuttled the camels back and forth between Sydney and Melbourne several times, but, despite the *Herald*'s counsel, no one was interested.





Above, "Afghan" and European Australians in Quorn, South Australia, about 1895. Right, a holiday postcard from 1908. Opposite, top, Noel Fullerton with a Camel Cup mount; lower, a herd destined for export to Indiana.

Finally, the governor of New South Wales bought the animals, along with a replacement male, and ordered them pastured on the Sydney Domain – government property in the capital. Two were painted nibbling on the lawn there in 1845, and the oil hangs today in Sydney's Mitchell Library.

In 1860, the camel was first called on to do the work for which it was ideally suited: long-distance exploration in a continent of some 7,000,000 square kilometers (about 2,700,000 million square miles) – roughly the area of the 48 contiguous states of the United States. But here, too, first results were far from promising.

A total of 26 camels, several originally imported from Aden in 1859 to perform in a show in Melbourne, were included in the 20-man, 23-horse Burke and Wills Expedition that set off from Melbourne in August in a bid to cross the unmapped continent from south to north. A picked team of four men, six camels and a single horse made the last 1,600-kilometer (1,000-mile) push from a base camp at Cooper's Creek, reaching the north coast in February 1861. But none of those camels – and only one man – made it back. Two of the camels were eaten, two were abandoned and two were destroyed when they became too tired to continue.

Instead, the relief mission that departed from Adelaide under John McKinlay in 1862 first proved the value of camels in rough terrain – for a novel reason. McKinlay never found Burke and Wills but did return with valuable reconnaissance, and he praised his camels for their ability to move over stones and through muddy, flooded country. "The camels acted famously," he wrote, "...from their great height they were as good [in protecting the expedition's stores] as if we had been supplied with boats."

Further camel-mounted expeditions helped unlock the secrets of the vast, arid interior of the country, pushing in the 1870's through South and Western Australia and what, in 1909, became the Northern Territory. Indeed, the first Europeans to set eyes on magnificent Ayers Rock, the 350-meter (1,140-foot) sandstone monolith on the central Australian plain, were the members of the camel-borne 1872 Ernest Giles expedition.

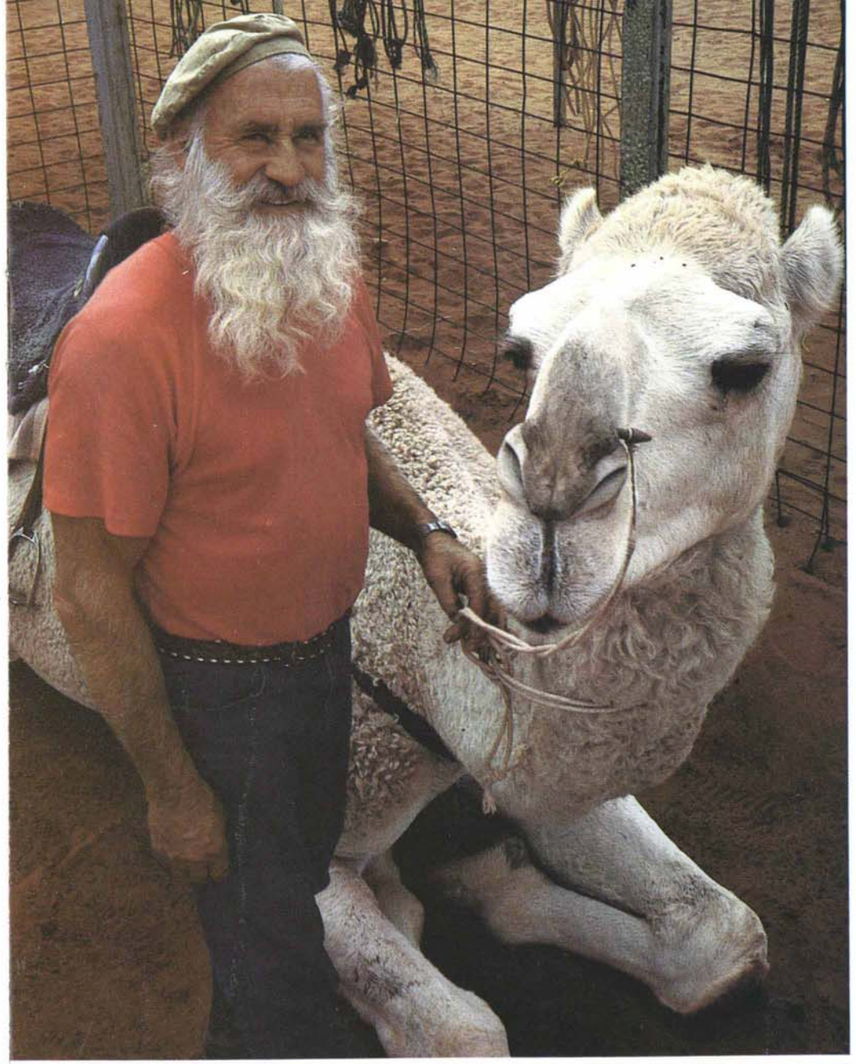
Australia's first large-scale camel importer was Scottish-born Sir Thomas Elder, whose interest in dromedaries can probably be traced to his own experience in the Middle East. Nine years after an 1857 camel journey from Cairo to Jerusalem, Elder started a stud farm about 400 kilometers (250 miles) north of Port Augusta with 121 camels shipped in from Karachi.

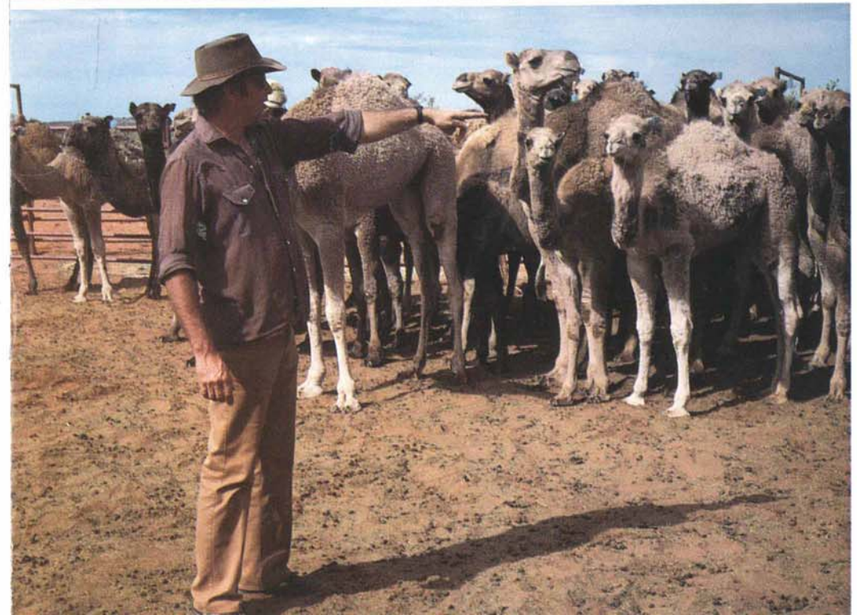
That first shipment, chosen with care to meet a variety of outback needs, included light camels for riding, medium-weight pack animals and heavy Kandahar dromedaries able to carry loads up to 650 kilograms (1,440 pounds). Elder's enterprise wasn't trouble-free, either: His herd was immediately struck by mange and reduced by almost half.

But with the animals that remained, supplemented by additional imports, he produced carefully bred beasts that consistently brought higher prices than any others, home-grown or imported.

The firm Elder founded continues today. And even though it long ago phased itself out of the camel trade, it has retained an interest in the animals. For example, the company supplied 10 camels for a 3,426-kilometer (2,124-mile), 117-day walk from Darwin to Adelaide by the Northern Territory and South Australia police forces. The expedition's arrival on January 1, 1988, was timed to kick off Australia's bicentennial celebrations. In 1986, Elders also aided a central Australian Aboriginal community trying to sell several thousand camels to the Moroccan government.

With Elder leading the way, Australian camel importers began to buy in earnest as the 19th century drew to a close. Between 1894 and 1897 alone, says McKnight, 6,000 camels were shipped from India directly to Western Australia, mainly to serve the booming gold camps. In 1910, there were more than 8,400 camels in the country. Numbers peaked around 1920 with some 20,000 in harness.





The *Sydney Herald* was vindicated. Camels, able to carry heavy loads over long distances and go for days without a drink, proved better adapted than horses or bullocks to working in a continent half of which is arid or semi-arid, where summertime temperatures often soar beyond 35 degrees Centigrade (100°F).

Camels did a variety of important jobs. They hauled the casings that lined the wells that tapped the underground water that opened wide areas to the livestock industry that is vital to the Australian economy to this day. They carried the fencing – and later the fence riders – that held back rabbits from the newly opened ranges; they lugged supplies to sheep ranches and mines and returned with bales of wool and wagonloads of ore; they dragged scoops to carve out lake basins; they pulled passenger coaches between towns where there was barely a road; and they transported policemen and postmen on their appointed rounds far from cities or towns.

Outback journeymen even found that the trails pounded smooth by the padded feet of hundreds of dromedaries made excellent routes for bicycling hundreds of kilometers between jobs.

The early camels weren't dawdlers, either. In a famous race, the mount of a cameleer named 'Abd al-Wadi was beaten by a horse in a 176-kilometer (109-mile) run between Bourke and Wanaaring in New South Wales, completed between sunrise and sunset. But the horse died the next day, while 'Abd al-Wadi proudly rode his camel back to the starting point.

At their zenith, dromedaries were in use in some three-quarters of the continent. And, in a bit of irony that Sir Thomas Elder might have relished, the Australian Camel Corps even served in Egypt and Palestine in World War I as part of Great Britain's Imperial Camel Corps. The force consisted of three companies of Australian Camel Corps to one British, and a company of Hong Kong artillery.

But by the middle of the 1920's the future was looking cloudy for Australian cameleers and camel ranchers – clouded by the choking waves of red dust sent up by automobiles and trucks, the new wave of imports into the outback. From the 30's on, in all but a few long-distance, off-road cases, the camel was a museum piece.

Camel men watched the value of their stock plummet. Many abandoned their beasts to the wild. But the feral camel thrived in the bush, "and he's still laughing there today," says Nick Smail, an Alice Springs camel-farm owner.

Recent surveys show wide camel ranges extending from the Northern Territory and South Australia in the center of the

Clouds of dust and exhortation rise around racers at the Alice Springs Camel Cup. Down-under rules require starting from a couched position.

continent well into Western Australia, with pockets of animals also reported in the northeastern state of Queensland.

Smail, who buys young, wild-caught animals for his tourist business from bush-country camel-catcher Ian Conway for A$500 (US$360) each, is one of a number of outdoor businessmen who cater to visitors to the outback. He offers short camel trips, including a camel-train stroll down the dry, sandy bed of the eucalyptus-lined Todd River to a hearty Australian dinner.

More adventurous travelers can take longer safaris into the bush. Some outfitters, who learned their skills from the sons of those original Muslim cameleers, offer treks of up to six months, though week-long or two-week trips are most popular.

Sunburned back-country ranchers who ride the ranges in four-wheel-drive vehicles have already rung up sales of dozens of animals to specialized buyers in the United States and Japan. And they're eyeing much bigger transactions, involving thousands of animals, that would send camels back to the Middle East – as top-quality livestock.

One of those deals, under negotiation with the Moroccan government, fell through in 1986 despite the involvement of the Australian Ministry of Trade. That five-year contract, for 10,000 camels to replace transport and work animals that had perished in a long-running drought, would have brought new jobs and much-needed cash to an Aboriginal community centered in Docker River, on the eastern flank of the Gibson Desert some 750 kilometers (465 miles) southwest of Alice Springs. But price was the snag.

The cost of sending a camel from Australia to Morocco was calculated at A$1,680 (US$1,200). "The Moroccans ended up walking camels up from [neighboring] Mauretania instead," explains Roz Mitchelson of the Australian Trade Commission's Middle Eastern-African Region.

Last spring, attention turned to the Aboriginal community of Amata, several hundred kilometers southeast of Docker River, where an Iranian group was discussing the purchase of 2,000 meat camels. But that deal, too, was hanging in the balance over the question of prices.

In Canberra, Mitchelson isn't positive about camel sales. "We're not going into the camel industry as a means of saving Australia's trade imbalance," she says. But the dream of marketing Australian camels in the Middle East is still very much alive.

Rather than shooting for pie-in-the-sky, 10,000-camel deals, it makes much better sense to look at "top-end" sales of high-quality animals, argues Tom Bergin, a Canberra-based camel expert who has served as an advisor to the Ministry of Agriculture and Water in Saudi Arabia and who once successfully doctored the Amir of Bahrain's prize bull camel.

Bergin, a veterinarian, is also a first-hand historian when it comes to camels in Australia. In 1977, he led a camel expedition in the footsteps of the ill-fated Burke and Wills Expedition from Cooper's Creek to the Gulf of Carpentaria in the north, burning off 18 kilograms (40 pounds) of his own bulk in the process.

Bergin believes there is promise in camel sales abroad, but he insists any program must be tailored to the strong points of Australia's herds. "The basic demand for camels in the Middle East is for racing, meat and milk," he says. "But the market is astute. They don't want just anything that's been hauled out of the bush." Trade between Australia and Saudi Arabia, for instance, makes no sense "unless it is going to be top-quality trade with a superb milking breed or very good racing animals."

Australians in Saudi Arabia point out that big camels recently shipped from Down Under to the United Arab Emirates to race were left so far behind on the track that they were laughed at. Bergin counters that the dromedaries used by Australian police and postal authorities up until the 1950's "are descended from some very, very good Indian and Omani types," and that those light, fast animals are still represented in certain herds of wild camels.

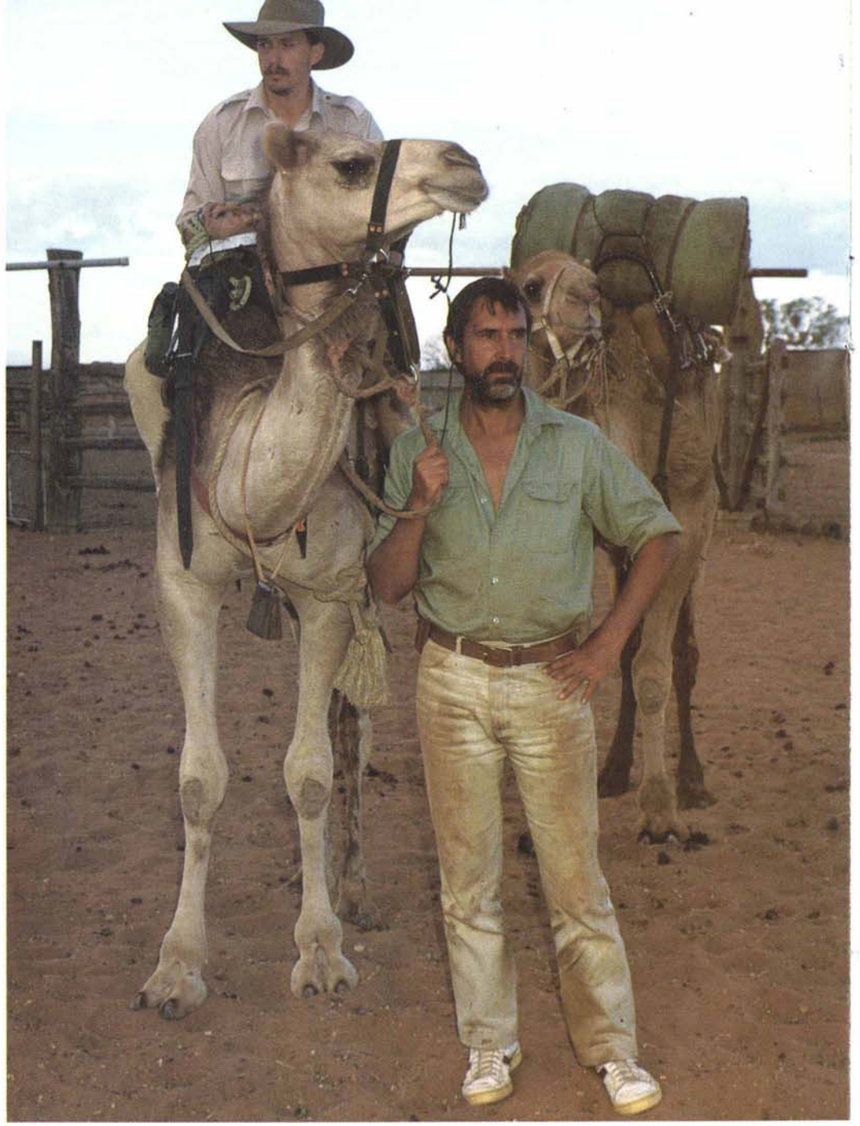
The biggest Australian camels, descended from Kandahar animals imported from India, weigh up to 900 kilograms (1,980 pounds), Bergin says. That's more than twice the size of a North African or Arabian dromedary, with comparably more meat. Females weigh in at 400 to 600 kilograms (880 to 1,320 pounds) and should be able to produce more than twice as much milk as their smaller cousins.

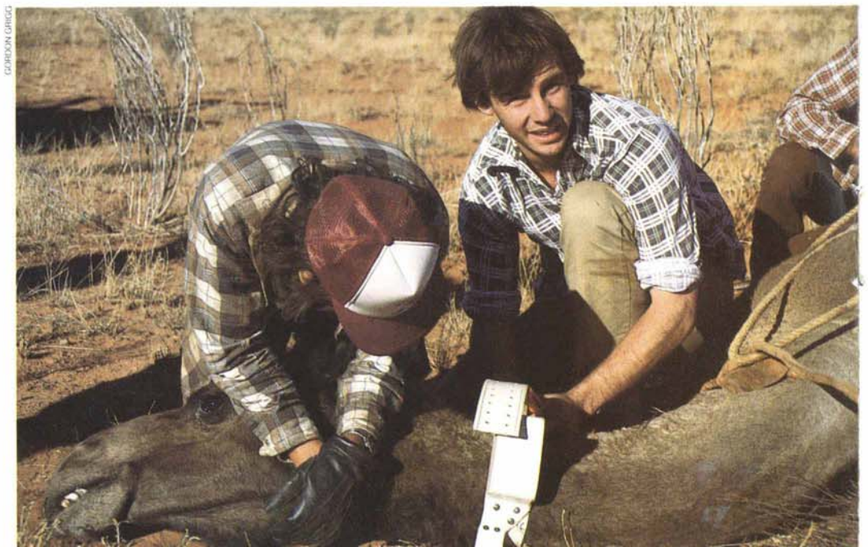
But that's only in theory. Bergin says pilot projects with fenced-in herds would be required to get a true picture of the animals' productivity. He thinks worthwhile results from such studies could be available two years from the start of work.

There is a potential home market for camel products, too, Bergin believes: It just wants promoting. "If you talk to Australians and say, 'What about drinking camel milk?' they'll laugh at you," he says. "But camel milk is very good when babies are allergic to cow's milk."

Aborigines far from supplies of fresh milk on isolated outstations, where infant mortality is high, could find camel milk a lifesaver, he says. "It's exceptionally high in vitamin C, and vitamin C is especially hard to come by in desert areas."

In Alice Springs, Aboriginal affairs authorities are working to target Middle Eastern nations for camel sales. Central Land Council land management officer Steve Roeger says the aim of the effort – which would enlist support from the Trade Commission and from experts like Bergin – "is to establish something that's going to last and be effectively producing camels at a reasonable price," to bring economic benefits to the Aborigines who live in camel country.





GORDON GRIGG

Roeger estimates it would be at least three years before the first camel could be sent overseas – if research into camel supply and demand, and the technical aspects of marketing, proved positive.

In Perth, the capital of Western Australia, the Ministry of Agriculture is carrying out preliminary research to identify markets for camels caught in the wild. Particular emphasis there is on raising breeding camels which could be exported to the Middle East for milking and racing.

Meanwhile, smaller-scale operators are already counting some profits from camel-catching enterprises, researchers are watching the dromedary from space and on the ground, and Australians in general – and tourists – are having fun with their long-legged friends.

Soft-talking Ian Conway, who runs King's Creek Station, a 800-square-kilometer (300-square-mile) ranch dotted with acacia trees and saltbush some 240 kilometers (150 miles) southwest of Alice Springs, supplies camels to several Northern Territory safari operators and to buyers abroad.

He and the young ranch hands he describes as "a good team of blokes" track down feral camels in the bush with motorbikes and off-road trucks for buyers and researchers alike.

Conway, who's proud of the "dash" of Aborigine blood in his veins, had 54 young female camels – collected in two months of chasing – in his corrals this spring, all set to airship to a purchaser in Galveston, Indiana. "Catching's not hard once you know what you're doing," he says with an understated grin. He and his hands head into the field with two four-wheel-drives and several motorbikes, locate a herd, "and quite often the boys jump off the bikes onto a camel," catching it rough-and-tumble if it's small enough. Big beasts are roped from bouncing Toyotas.

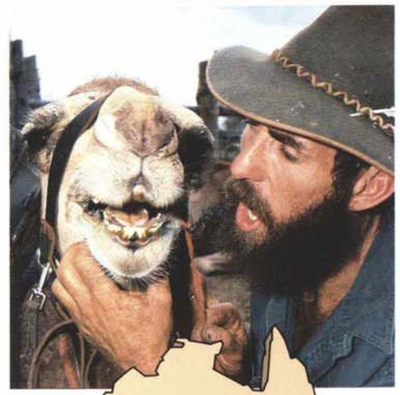
"We've had no major injuries – just a few broken bones. That's the good thing about having 'a dash' in you."

While catching camels may not be too hard on humans, it takes its toll on vehicles. "We spend two days at a time in the field, maximum, before going in for repairs," says the rancher. "You're always under the bonnet fixing something."

Conway's "blokes" are currently breaking in camels for use on safaris on King's Creek Station, on the edge of the planned King's Canyon National Park, and getting ready for a run at the A$100,000 (US$71,500) Great Australian Camel Race, another event timed for the country's bicentennial. The course covers 3,260 kilometers (2,025 miles) from Ayers Rock to the Gold Coast in the east, beginning in April.

The camel man says the race will draw about 300 riders, including "60 Arabs, Americans and Japanese." He claims the race will be "the biggest publicity thing Australia has ever produced, even bigger than the America's Cup because it's so unique." If he can find a sponsor willing to put up A$50,000 (US$35,750), Conway plans to start training six riders and animals in earnest this month. "We're going in to win it, not for our health," he says.

Conway's camel-catching forays have also been undertaken in the name of science. In the spring of 1986, he and his crew captured two females from separate herds so that accompanying biologists from the University of Sydney could attach radio collars around their necks.



Opposite, top, and above, a stop on the Darwin-to-Adelaide bicentennial trek. Opposite, below, a camel is fitted with a radio collar for satellite tracking.

That operation, directed by Gordon Grigg, an associate professor of biology, has enabled researchers to track camels by satellite through country rarely frequented by man, opening up a new chapter in wildlife study.

Radio signals are transmitted every three days to two U.S. weather satellites in polar orbits, and then sent through the joint U.S.-French ARGOS satellite data-processing center in Toulouse, France, to a desk-top computer in the university's zoology building. The computer readouts give the latitude and longitude for each animal, locating the camels to within a kilometer (1,100 yards).

The information is important in itself, since wild camels have never before been tracked over the long term, but it also has a very practical application: Camels are considered pests in Australia because they break down fences and can compete with livestock for food. Solid data about their ranges are critical to ranchers and conservation authorities.

One of the A$4,000 (US$2,860) camel-collar radios went off the air last spring after 11 months of broadcasting, but the second was still sending strongly in midsummer. Up to that time, the camels had moved less each day than anecdotal information had earlier suggested. However, each had moved more than 200 kilometers (125 miles) from its release point.

At the same time, ground-bound camel researchers from a zoological institute in Braunschweig, West Germany, have begun taking notes on the activities of a herd of 36 camels at Babbler Bore, some 350 kilometers (220 miles) northwest of Alice Springs. The Germans plan to study the herd's behavior for two years.

But in Alice Springs itself, last May, attention was on races, not research. The annual Alice Springs Camel Cup went international, presided over by safari operator Noel Fullerton – dubbed the "Camel King" by the press – and U.S. Ambassador William Lane, with a team of riders from Virginia City, Nevada, in the running.

The Americans even brought along a meter-high (three-foot) International Camel Cup trophy – and they left it in Alice Springs.

"They lost abysmally" by Down-Under rules, comments one of the local riders. Says Fullerton, a bushy-bearded, pony-tailed cameleer who's been in the business for 20 years, "It was a joke. I rode backwards and still won." But, he adds, "They were all very nice people – excellent ambassadors for America."

And it's just possible that Fullerton may get much more than he's bargained for the next time Alice Springs' International Cup rolls around. According to the Northern Territory Tourist Commission spokesman in Alice Springs, the commission's London office has received inquiries from Saudis, Kuwaitis and Japanese riders about participating in the races.

"The event is becoming widely known," says Denham Jones, adding, with a touch of Australian understatement, "Saudi participation would certainly add a whole new dimension."

What would Harry, Australia's calamitous first camel, think of all this? That's hard to say. But Alice Springs' turn-of-the-century cameleer Charlie Sadadeen would probably just puff on his remarkable, long-stemmed pipe – and smile.

Arthur Clark, an Aramco staff writer in Dhahran, visited Australia last spring. He has previously encountered camels during his years in Morocco and Egypt.

E.M. FORSTER

A PASSAGE TOWARD INDIA

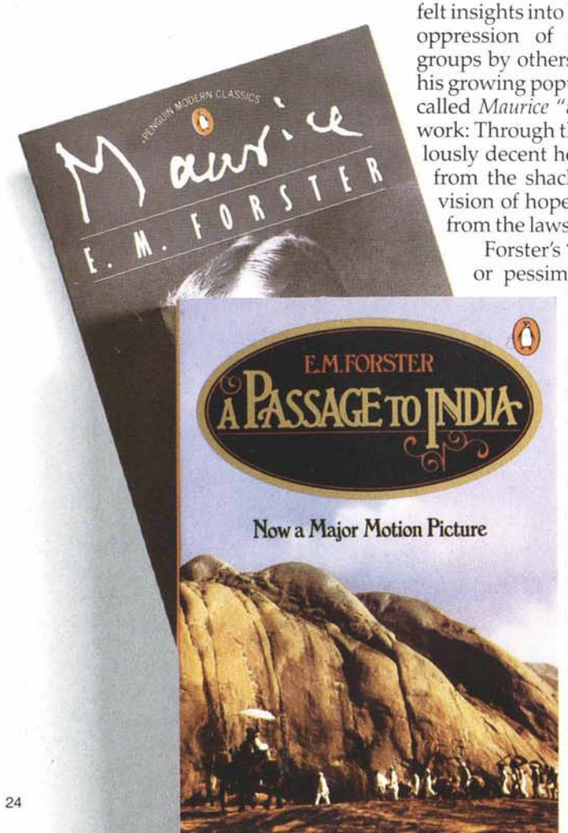
WRITTEN BY DANIEL PAWLEY
ILLUSTRATED BY NORMAN MACDONALD

David Lean's hugely successful film version of E.M. Forster's *A Passage to India* set its minute examination of the human heart against the backdrop of epic changes in British India. *A Room With A View*, which also dealt with attempts to bridge the gap between cultures and classes, won three Academy Awards. And now critics and movie-goers are discussing *Maurice*, the third of Forster's novels to be filmed in recent years.

We can't seem to get enough of Forster these days. Why?

Above all else, there is the artistic excellence of the novels: vividly-hued landscapes of England, India and Italy; sympathetically yet unsentimentally created characters who lodge in our imaginations; rich catalogues of gesture and nuance in a never-ending war against miscommunication and disconnection. Forster's heart felt insights into human alienation and the oppression of some racial and social groups by others provide further clues to his growing popularity. One commentator called *Maurice* "a beautiful and poignant work: Through the character of its scrupulously decent hero who liberates himself from the shackles of society it offers a vision of hope to all who feel alienated from the laws of the tribe."

Forster's "vision," whether of hope or pessimism – it can be argued both ways – matured considerably during his years with the International Red Cross in Alexandria, Egypt. Seeking noncombatant involvement during World War I, he served from November 1915 to January 1919 as a "hospital searcher" at the local Red Cross facility. Forster's main responsibility was to interview the wounded troops for information about missing soldiers but, like Walt Whitman during the American Civil War, he spent much time tending to the needs of the wounded: writing letters, fetching small comforts, and aiding their recovery.



Forster had arrived in Egypt shortly after his significant visit to India, and he returned there, after his years in Alexandria, to complete his masterwork, *A Passage to India*. This India-Alexandria-India sequence seems highly significant in the creation of the novel, thought to be one of the 20th century's greatest: The seed of the masterpiece was planted in India, matured in Alexandria and flowered during the second trip to India.

While in Alexandria, Forster also produced a number of non-fiction works, minor in comparison to *A Passage to India*, yet fully able to stand on their own. For the *Egyptian Mail*, a local newspaper popular with the British community, he wrote articles like "Our Diversions," a lively account of Alexandrian cultural events; "Handel in Egypt," a review of Handel's *Messiah*, which Forster thought good music, yet the peak of English sentimentalism transplanted to foreign soil; and "Cotton from the Outside," a humorous sketch about visiting the Alexandria Cotton Exchange with a Greek businessman, Pericles Anastassiades. In this latter article, a verbal exchange ensues very much in the style of Mark Twain.

"Oh Heaven help us!" Forster shouts. "What is that dreadful noise? Run, run! Has somebody been killed?"

"Do not distress yourself...," Anastassiades responds. "It is only the merchants of Alexandria, buying cotton."

"But they are murdering one another, surely?"

"Not so. They merely gesticulate."

"Does any place exist where one could view their gestures in safety?"

"There is such a place."

"I shall come to no bodily harm there?"

"None. None."

"Then conduct me, pray...."

Many of Forster's Egyptian writings are gathered in his book, *Pharos and Pharillon* (1923). He also published an influential pamphlet, *The Government of Egypt* (1920), in which he supported views that Great Britain should recognize the independent status of Egypt, that British troops and advisers should be withdrawn from Egypt immediately, and that the Suez Canal Zone should be leased to Egypt for a term of years. Though the views originated with others, Forster's support of them clearly showed his growing anti-imperialist

inclination, a perspective that would blossom fully in *A Passage to India*, where British involvement in India's social and political life is seen as a great evil.

The novelist's other significant Egyptian work was the brilliant *Alexandria: A History and a Guide* (1922), which for some enthusiasts remains the most insightful travel book ever written about Alexandria. "Charming and scholarly," writes one such commentator of this volume, which is part lively history and part well-illustrated travelogue, woven together into a concise 225 pages in which Forster says what another writer might have taken 500 pages to say. What is even more special about *Alexandria: A History and a Guide* is that it foreshadows more graphically than any other work the coming of *A Passage to India*. As a biographer notes, "Many of the pages ... open a route that leads straight to the great Indian novel."

In truth, however, nearly everything Forster observed, experienced and produced in Alexandria leads to "the great Indian novel." He absorbed the elements of his new environment, not with the novice's sense of infatuation – he was approaching 40 and had already established himself as a literary celebrity with the publication of *Howard's End* (1910) – but as a seasoned veteran familiar with Eastern and Western intricacies. Beauty and mystery, oppression and compassion, politics, spiritual searching, and enmity between social and racial groups – each passed before Forster's artistic eye and through his mature, reflective mind.

To a close friend, S. R. Masood, Forster wrote on December 29, 1915: "All that I cared for in civilization has gone forever, and I am trying to live without either hopes or fears – not an easy job, but one keeps going somehow." This first letter from Egypt seems to indicate a receptive mind, removed from distractions and aching with disillusionment. Forster knew the bitterness of social ostracism, a theme he explores in *Maurice*.

Yet he was primed to make clear observations, and prepared to witness ambiguities and contradictions without bias. Much later, regarding generalizations about the Middle East, he was to write in *Abinger Harvest* (1936), "What is the use of generalizing...? Syria isn't Egypt nor Turkey Arabia; what is true of the Moslem is only partly true of his Christian compatriot; classes vary, conditions alter...."

It was "the spirit of the East," Forster believed, that would help him better understand the region: "The East isn't palm-trees and sunsets, or friendly rogues, or the Harem.... It is a spirit also, and... we must attempt to define it."

Once settled in Alexandria, Forster began to demonstrate that he was finely attuned to the new environment. His unsentimental appreciation of geography there, for instance, resembles the landscape and sunset descriptions of *A Passage to India*. He described a seaside villa to his future "biographee," Goldsworthy Lowes Dickinson:

> I'm writing...at Montazah this morning. It is the country place of the ex-Khedive and has been turned into a Convalescent Hospital. Among its tamarisk groves and avenues of flowing oleander, on its reefs and fantastic promontories of rocks and sand, hundreds of young men are at play, fishing, riding donkeys, lying in hammocks, boating, dozing, swimming, listening to bands.

His descriptions of the sun and moon – even in letters to friends – parallels his attention to the heavenly bodies in *A Passage to India*. In the novel, Forster carefully weaves into his text ancient myths about the origins of the universe.

One such myth, paraphrased, holds that the two sibling bodies are eternally inimical to each other. The light-bearing Queen of the Night was the first-born of the Primal Egg – the ancient Earth Mother. The sun, born later, turns to abuse its mother and her other child, the moon. Hence, the moon loses half her kingdom to the sun's day and is monthly devoured, piece by piece, by this enemy. In describing the moon as "the exhausted crescent that precedes the sun," Forster pits the sun and moon against each other and personifies them; the seeds of such mythologizing were already germinating in Alexandria. He writes in a letter dated August 25, 1917, "The half moon, with beautiful blue markings on its primrose, stands looking at the sunset." The summer skies of Alexandria were apparently serving as a personal observatory where Forster could, like an ancient Arab astronomer, monitor the heavens – a process crucial in the preparation of *A Passage to India*.

However, Forster was a people-watcher, too, always interested in the inhabitants of Alexandria and of Egypt. His references to children, for instance, reflected a close attention to personality, physique, and facial gestures. Attire, physical features and movement all attracted Forster's attention, and his letters indicated that he enjoyed the temperament of his Egyptian acquaintances. They were a "mild and cheerful people," he wrote on one occasion, "especially to one who had known Indians" – and they were "an easy people to live with."

Intellectually, however, he identified more closely with the Greeks of cosmopolitan Alexandria. To be with them, he noted, was "to re-enter, however imperfectly, the Academic world. They ... effervesce intellectually, they do have creative desires, ... " This affiliation bore fruit for Forster, and indeed for the literary world at large, in his friendship with the Greek poet C.P. Cavafy, whom he later introduced to the West. Born to cotton and wheat exporters from Constantinople, Cavafy was working as a civil servant in Alexandria when Forster "discovered" him. Today Cavafy is viewed as certainly the greatest Greek poet of the 20th century.

Another friendship Forster initiated was with Mohammed al-Adl, a tram conductor in Alexandria. Forster's letters of the period focus on a richness of friendship and mutual concern in the relationship that tend to overshadow its physical dimension. He wrote to his longtime friend Florence Barger, "When you are offered affection, honesty, and intelligence ... (including a delightful sense of humor), you surely have to take it or die spiritually." It was Adl who fell ill, however, and eventually died, leaving Forster alone but with tender memories.

Individual tenderness attracted Forster, regardless of the giver's social or national background. The devout Muslim physician, Aziz, in *A Passage to India* – a character who in many ways seems representative of Mohammed al-Adl – is known for his tenderness, charm, and sensitivity. Forster writes, "His face grew very tender .... He was tender to everyone, ... even to the English; he knew at the bottom of his heart that they could not help being so cold and odd and circulating like an ice stream through his land."

He was also, of course, attracted to the details of history that surrounded him in Alexandria. Unlike Western writers who first encountered Middle Eastern antiquity at less mature stages – the American writer Mark Twain comes to mind – Forster was objective, examining facts carefully, commenting on them after patient observation, always letting history serve him rather than overwhelm him.

Since he wrote his imaginative works both before and after his Egyptian period,

most commentators agree that Forster responded historically, not imaginatively, to Alexandria. However, it might be better to say that history caused him to respond imaginatively to the city. In *Abinger Harvest* he would reflect upon his ongoing fascination with "The Past," devoting a fifth of that volume to historical wonders. He wrote, somewhat imaginatively,

> It is pleasant to be transferred from an office where one is afraid of a sergeant-major into an office where one can intimidate generals, and perhaps this is why History is so attractive to the more timid amongst us. We can recover self-confidence by snubbing the dead. The captains and the kings depart at our slightest censure, while as for the "hosts of minor officials" who cumber court and camp, we heed them not, although in actual life they entirely block our social horizon.

One reason why *Alexandria: A History and a Guide* reads so commandingly is Forster's trick of shuffling like cards the faces and names of Alexandria's history. The book represented his attempt to reconstruct "a ghost city" inhabited by the eternal presences of Alexander, Cleopatra, Eratosthenes, and other immortals. Short, concise character sketches give the book its human element.

Of the twin ambitions of Alexander and Cleopatra, for instance, Forster writes:

> Thus the career of the Greco-Egyptian city closes, as it began, in an atmosphere of Romance. Cleopatra is of course a meaner figure than Alexander the Great. Ambition with her is purely selfish; with Alexander it was mystically connected with the welfare of mankind. She knows nothing beyond the body and so shrinks from discomfort and pain: Alexander attained the strength of the hero. Yet for all their differences, the man who created and the woman who lost Alexandria have one thing in common: monumental greatness; and between them is suspended, like a rare and fragile chain, the dynasty of the Ptolemies.

Forster gave Alexandria a breathing spirit of its own. Though the city owed its creation to Alexander, in his book it becomes its own entity as ages pass. It gives birth, nurtures, accepts, rejects – but most of all, it transcends and outlives the paltry humanity that filters through it. Cleopatra becomes "the last of a secluded

DR. AZIZ

and subtle race, ... a flower that Alexandria had taken three hundred years to produce and that eternity cannot wither ...."

Centuries later, Forster's city becomes middle-aged. Amr, the multi-talented Arab poet-general, drives the wicked Alexandrian genius Cyrus from the city and back to Constantinople. Described by Forster as "one of the most charming men that Islam ever produced," Amr helps to usher Islam into the territory. Forster narrates:

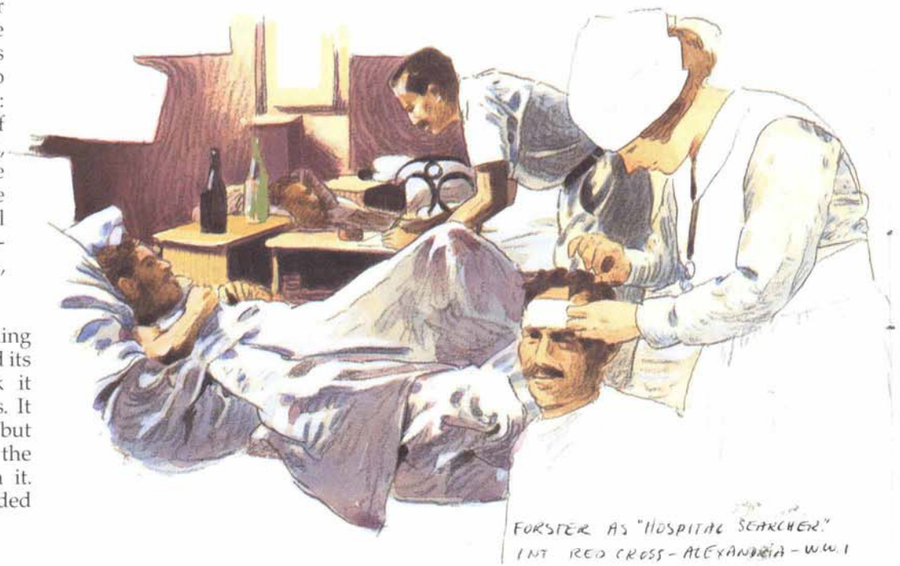
> Riding into Egypt by the coast where Port Said stands now, he struck swiftly up the Nile, defeated an Imperial army at Heliopolis and invested the fort of Babylon. Cyrus was inside it .... He knew that no native Egyptian would resist Arabs, and he may have felt, like many of his contemporaries, that Christianity was doomed, that its complexities were destined to perish before the simplicity of Islam.

Time passes again, and Alexandria enters the modern age, beginning with the reign of Mohammed Ali during the early 1800's. And with history receding before him, Forster begins to wind his narrative down. A few topics remain to be considered, but Forster is losing interest as his pocket history trails off to become a guidebook of present-day Alexandria. His ghost city fades once again into the wisps of memory.

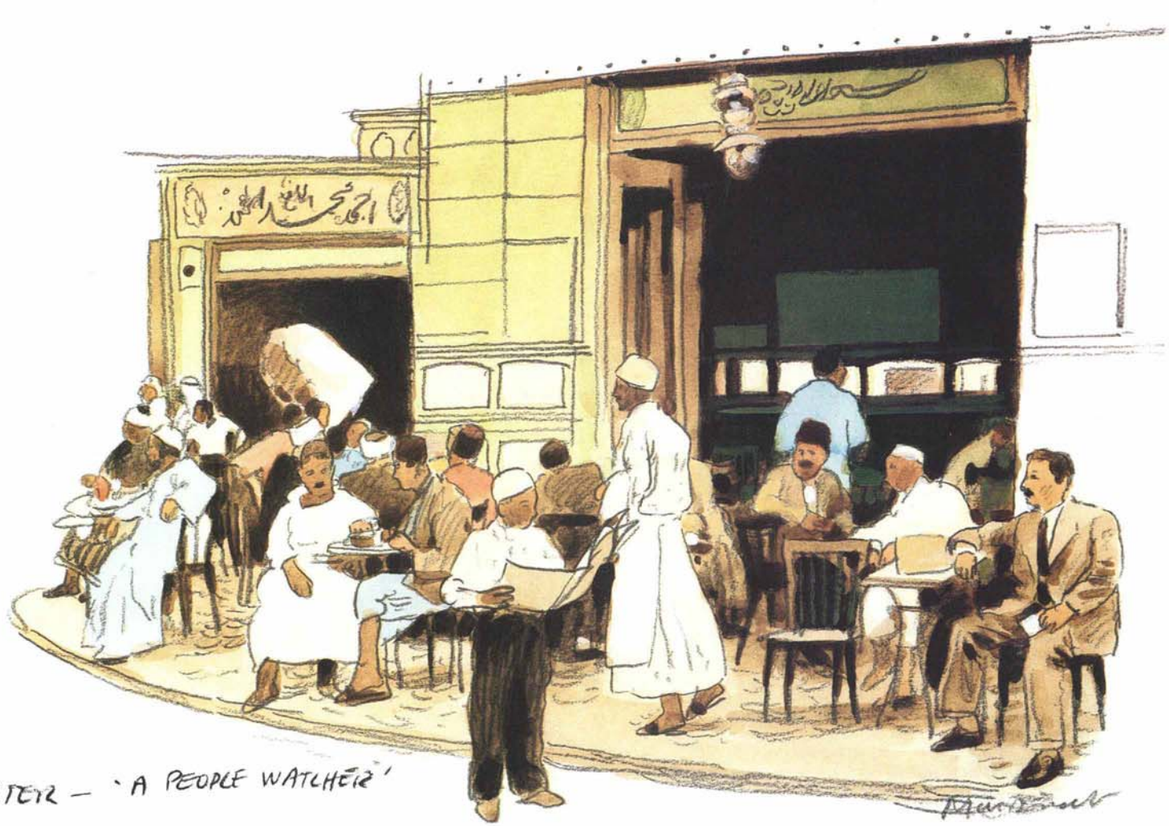
When he was not dwelling on history, Forster busied himself with his work at the Red Cross hospital. He was the prototypical conscientious objector, viewing his calling earnestly and with deep empathy for victims of battle, and never losing his animosity toward military powers and the wars they waged. Of the pain and humiliation that he faced each day, he complained to a friend,

> Oh my God the mess – the suffering in the hospitals which here and everywhere are crammed, the decent young men all so free from nonsense and false pride, so calm about the enemy ... and over their heads solemn bloody lies. War ... is almost devoid of hate.

As throughout the entire text of *A Passage to India*, he began to cast the blame for misery on the presence of the British military in a land where it didn't belong. The



FORSTER AS "HOSPITAL SEARCHER." INT. RED CROSS - ALEXANDRIA - W.W. I



FORSTER – 'A PEOPLE WATCHER'

army dehumanized people in a continuing nightmare of regulations enforced by violence. Early in 1918 Forster despairs, "The army just shovels [people] about like dirt .... One can face bad luck and unhappiness. It is the process of organization and dehumanization that is such a nightmare to me...."

He would, of course, document his contempt for British imperialism in *The Government of Egypt*. And there was more disparagement to come once Forster had left Egypt and returned briefly to England before his second trip to India. He sympathized with Egypt after Britain had rudely thwarted the country's efforts toward independence. Writing for the *Manchester Guardian* in the spring of 1919, he reflected:

> When I arrived in Egypt the people were invariably friendly, but in 1918 there was a marked change – silence from the adults, and from the children an occasional hooting which, trivial in itself, showed how the wind was blowing. And just at the time of our victories a plaintive little popular song was born and sung to a minor tune about the street – "My native town, oh my native town! The military authorities have taken my boy."

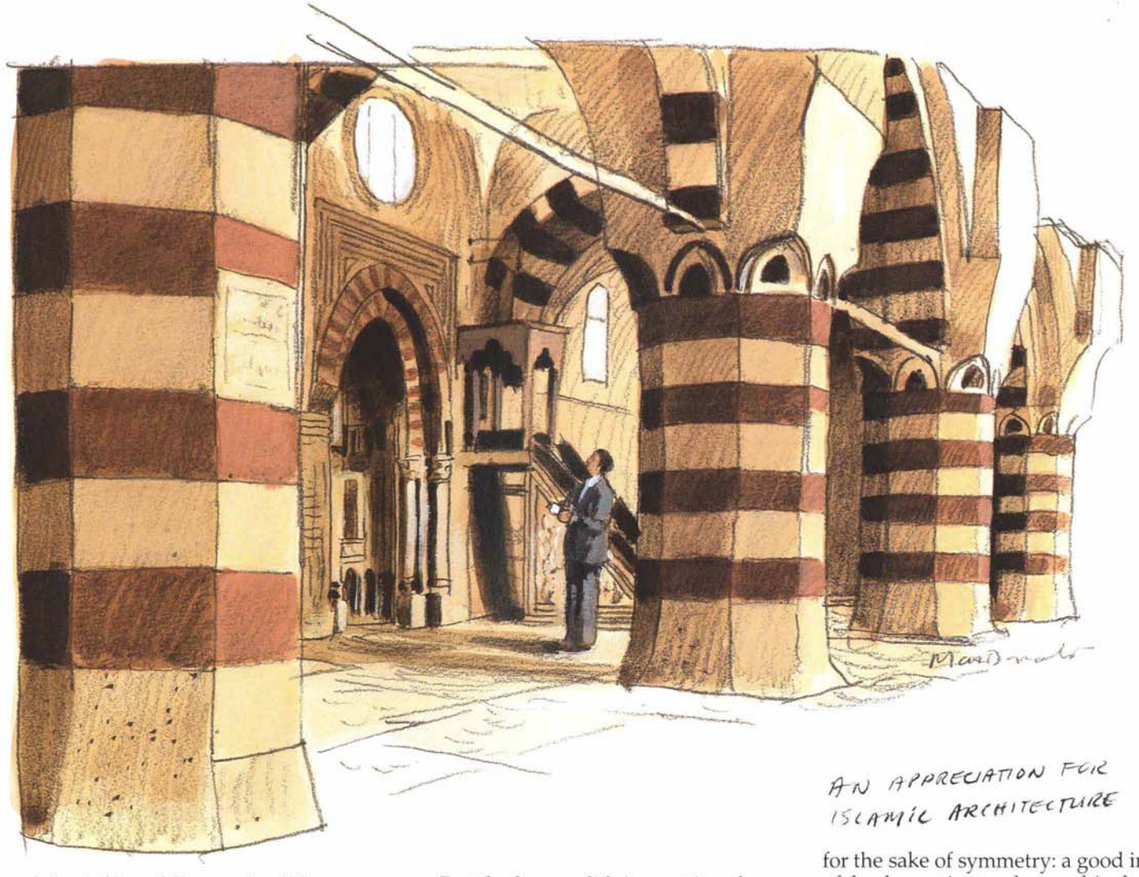
In all of Forster's disdain for British "bungling," one recalls Aziz's angry plea for Indian unity without foreign – especially British – intervention. On the closing page of *A Passage to India*, the Muslim doctor, humiliated by the British, shouts:

> "India shall be a nation! No foreigners of any sort! Hindu and Muslim and Sikh and all shall be one. ... Down with the English anyhow. That's certain. Clear out, you fellows, double quick, I say. We may hate one another, but we hate you the most.... If it's fifty-five hundred years we shall get rid of you, yes, we shall drive every blasted Englishman into the sea...."

Such attitudes were certainly foreshadowed while Forster matured in Alexandria. Further, though he laid much blame on his fellow countrymen for the strife in both Egypt and India, he was not naive enough to leave it there. Social and racial gulfs grew ultimately from something far more elusive and mysterious than one country's political domination of another: The enmity was partly psychological, partly sociological – and perhaps partly the "ancient night" of human and prehuman existence.

When encountering this "ancient night" deep within the primeval Marabar Caves in *A Passage to India*, Forster writes, "What dwelt in the first of the caves? Something very old and very small. Before time, it was before space also. Something snub-nosed, incapable of generosity – the undying worm itself."

Essentially the same thoughts, less carefully articulated, occurred to Forster during the Alexandria period. When he discovered his own inherent racism, for instance, he claimed it helped him to understand his countrymen better, but he despised it for its small, worm-like quality. "It's damnable and disgraceful, and it's in me," he lamented, just months into his tour of duty. Another time, despairing of the prejudiced judgements human beings apply to one another, he argued, "How misleading generalizations are, whether racial or social. I envy children their power of regarding each person as a new species." Finally, Forster, in Alexandria, spoke several times about a "psychological hitch" that takes place when humans try to connect socially. The difficulty emanated somehow from a disjuncture between our private and public selves, he believed: We have good intentions toward each other privately, but when we take those intentions public something runs amok.



AN APPRECIATION FOR ISLAMIC ARCHITECTURE

> Man in his public capacity [is] a contemptible failure .... Privately most men attain to love and unselfishness and ... one would expect them to display these qualities in their social life, for they certainly bring earnestness of purpose to it. But some psychological hitch takes place, whose nature is not easy to determine .... Gulf between "private" and "public" has .... dizzying....

Forster deplored this "hitch." He longed for unity between peoples. Even after Mohammed al-Adl died, he wrote to him a kind of plea for oneness: "It was dark and I heard an Egyptian shouting who had lost his friend: Margan, Margan [the name Forster went by] – you calling me and I felt we belonged to each other, you had made me an Egyptian."

Egyptian and Englishman, Arab and European, Hindu and Muslim and Christian, East and West – Forster felt the human race had been somehow cheated by the improbability of establishing and maintaining lasting relationships. "Why can't we be friends now?" says a voice at the end of *A Passage to India*. "It's what I want. It's what you want." And then Forster's chilling conclusion:

> But the horses didn't want it – they swerved apart; the earth didn't want it, sending up rocks through which riders must pass single file; the temples, the tank, the jail, the palace, the birds, the carrion, the Guest House... they didn't want it, they said in their hundred voices, "No, not yet," and the sky said, "No, not there."

It was fitting that in his desire for unity Forster should use as an epigraph to *Alexandria: A History and a Guide* the words of Ibn Dukmak: "If a man make a pilgrimage round Alexandria in the morning, God will make for him a golden crown, set with pearls, perfumed with musk and camphor, and shining from the East to the West." Forster, in Alexandria, treated Muslim concerns with a reserved admiration.

He certainly held an appreciation for Islamic architecture. Devoting plenty of space in *Alexandria: A History and a Guide* to the description of various mosques, he analyzed interiors and exteriors with considerable insight. Of the inside of the Chorbagi Mosque (built in 1757) on Rue el Midan, he wrote: "The door of the pulpit is handsome; it has duplicated Kufic inscriptions, which on the right read from right to left, as is usual, and on the left are reversed for the sake of symmetry: a good instance of the decorative tendency of Arab art."

And in *Abinger Harvest*, where he thrust himself into the role of a mosque, he explained in the first person: "I was built... in the first place at Medina, where I was a courtyard, and if you would understand me today you must still think of me as a courtyard...." He further claimed that the mosque – like all authentic religious architecture – faithfully expresses its theological beliefs, adding:

> The [Ka'ba], the worship ... , the [Makkah] position, do not succeed in obscuring the central truth: that there is no god but God, and that even Mohammed is but the Prophet of God; which truth, despite occasional compromises, is faithfully expressed in Moslem architecture, and should be remembered by those who would understand it.

Forster, despite his appreciation for the Hindu religion, felt he could understand Islam far better. Early in his second visit to India he wrote of the security he felt in knowing that Muslims were not beyond his comprehension, whereas Hindus remained obscure. "The more I know the less I understand," he reflected.

> When ... I stood on the minaret of the Taj in Agra, and heard the evening call to prayer from the adjacent mosque, I knew at all events where I stood and what I heard; it was a land that was not merely atmosphere but had definite outlines and horizons. So with the [Muslim] friends .... They may not be as subtle or suggestive as the Hindus, but I can follow what they are saying.

Thus the straightforwardness of Dr. Aziz in *A Passage to India* stands in sharp, refreshing contrast to the complexities of the ever out-of-focus Professor Godbole, the Hindu. And in Aziz, we see the fundamental security a Muslim feels: "He himself was rooted in society and Islam. He belonged to a tradition that bound him ...." Forster had seen such "rootedness" while living in Alexandria, concluding his chapter "Islam" in *Alexandria: A History and a Guide* with these words:

> There is no God but God, and Mohammed is the Prophet of God, says Islam .... The man Mohammed has been chosen to tell us what God is like and what he wishes, and there all machinery ends, leaving us to face our Creator.

The Alexandria interval must in the end be seen as necessary to Forster's development as *A Passage to India* grew within him. We often read about great writers who began their most significant books at premature times and places, and wind up finishing them years later. The in-between time allows the original vision a chance to solidify while new experiences supply maturity and richness. As one Forster commentator notes, "Alexandria ... provided a resting place, a point of balance, a breathing space in which to reflect... [and] a vantage point from which to develop a new vision of life."

Forster would certainly have agreed, writing midway through the period that there were "things in these last ... years that I can never be too grateful for, never. My work here is obscure and occasionally humiliating. Never mind. It's been worth my while." And in his final letter from Egypt, dated January 1919, he concludes, "I leave Egypt in comparative content."

He would return to England, and then to his beloved India – where he "hoped to die someday" – but he was never to lose the Alexandria of his middle years.

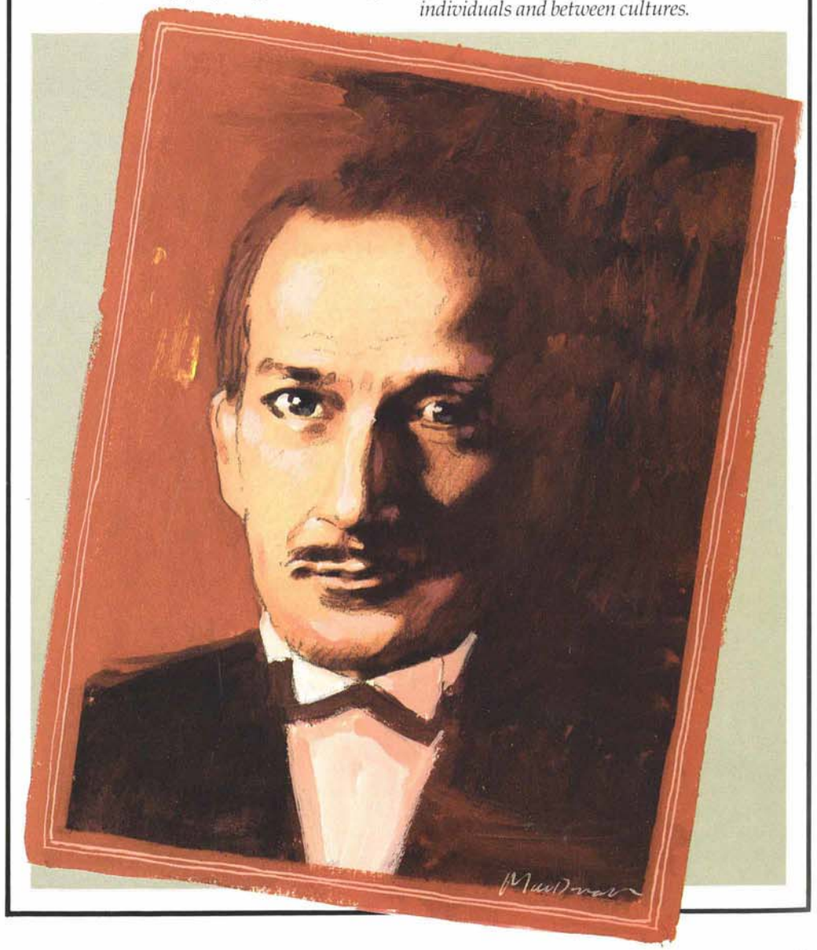
Daniel Pawley, an assistant professor of communications at Northwestern College in St. Paul, Minnesota, has studied topics relating literature and Middle Eastern history.

PUBLISHABLE -BUT WORTH IT?

Forster wrote that assessment across the manuscript of his novel Maurice, *which indeed was not published until after his death. The book has now become the third of Forster's novels to be filmed, and – owing to the surprise popularity of* A Room with a View *– film buffs are waiting in line for it.*

Both films represent the work of Merchant-Ivory, the producer-director team that also gave us Heat and Dust, The Bostonians, *and* Shakespeare Wallah, *all elegant films immediately recognizable by their pinpoint attention to social and historical detail. Ismail Merchant, a producer of Indian descent, has said that E.M. Forster's books adapt well to the screen because they challenge talented actors: They give them good lines to recite. And* Maurice, *the story of a young man's search for his identity, has attracted the talents of Rangoon-born actor James Wilby, who literally walked onto the set of* A Room with a View, *and Ben Kingsley (below), who played the leading role in the film* Gandhi.

Though some film critics expected Maurice *to achieve as much critical success as* A Room with a View *did, the first reviews were lackluster. Public interest was high nonetheless, and the film is expected to draw its share of controversy with its challenge of upper-middle class taboos and its handling of homosexuality. Both Merchant and his partner James Ivory, an American-born director, agree that a little controversy might be just what the doctor ordered – to get people talking not only about contemporary issues, but also about the age-old problem of bridging the abyss between individuals and between cultures.*



DR. SACKLER'S BURIED TREASURES

WRITTEN BY
AILEEN VINCENT-BARWOOD
PHOTOGRAPHED BY
DALE O'DELL

For two decades, the visionaries at the Smithsonian Institution, led by Secretary S. Dillon Ripley, dreamed of adding a magnificent new museum complex to the seven museums that already line Washington's National Mall.

The decision-makers envisioned an edifice that would embrace a splendid collection of art and artifacts from Africa, Asia and the Near East. Along with the art, they planned, there would be workshops, research and conservation laboratories, an international study center, offices and seminar rooms, an auditorium and reception hall, libraries and archives, and galleries for displaying rotating exhibits of the Institution's extraordinary jumble of riches. But –

Underground?

Horrified, the Smithsonian's old guard, various clients and members of "the nation's attic," and public-interest groups that safeguard the capital's cityscape all raised their voices in consternation.

Grey granite faces the elegant entrance to the Arthur M. Sackler Gallery, above.

Formal gardens top the Smithsonian's new subterranean museum complex below.

Late last September, the dream was inaugurated with suitable ceremony, and today, 20 years after the idea was first conceived, seven years after the first drawings were done, and four years after ground was broken for the vast underground complex, the opposition is pacified. Though there are still some who hold reservations about burying people and priceless treasures more than 15 meters (50 feet) below ground, the majority aver that the new complex, with its National Museum of African Art and its Arthur M. Sackler Gallery of Far and Near Eastern Art, is a triumph.

For, improbable as it sounds, the subterranean complex is itself a spectacular work of art. Not only is it a backdrop for masterpieces, but – from its entrances to its smallest galleries and offices – it surrounds the visitor with space, light and air. Subtle play of light and shadow; long vistas of galleries, fountains and pools; reflections on still and moving water; interesting shapes, contrasting contours and lines, and some architectural feats that are pure 20th-century genius characterize this new museum, one of only three underground museums in the world.

Nearly 96 percent of the three-story, $72.3-million complex sprawls beneath the 17,000-square-meter (4.2-acre) Enid A. Haupt Garden located in the South Yard, a former parking lot. Standing amid this garden's formal plantings and antique furniture are the entrances: a whimsical copper-domed kiosk, and two elegant pavilions.

Once the decision to build underground was reached, the challenge became the method of construction. There were numerous problems, not the least of which was how to protect the garden's 100-year-old linden tree during the four years of excavation and building, and – even more important – how to preserve the foundations and walls of the venerable Castle to the north and the old red brick Arts and Industries building to the east. (It took $850,000 just to save the linden tree.)

Too, the roof of the complex would require a special design to support the $3-million Haupt Garden. And, since one-third of the complex, its people and its priceless treasures would be below the water table, it would need to be waterproofed.

From the start, it was obvious that no ordinary construction method would do; instead a technique developed in France was used. Rather than drive steel beams into the ground to frame the 5,600-square-meter excavation site (at 60,000 square feet the size of a football field), French engineers employed the concrete-and-slurry method, which consists of pouring concrete, without forms, into steel-framed, slurry-filled trenches which are then tied back with steel cables. The result is a pair of linked but separate vertical walls. For the building's foundation, more than 17 meters (57 feet) below the garden, a 106-centimeter (3.5-foot) reinforced concrete foundation mat was poured. And, because the permanent water table lies just below the second level of the complex, the builders installed a drainage and automatic pumping system and coated the walls with coal-tar waterproofing.

To cool, heat, and ventilate the building, pump water for the pools and fountains, and provide municipal services to the three levels, a two-story mechanical room runs the length of the structure. The building's heating and air-conditioning units are located atop the nearby Freer Gallery building which will, in time, connect to the complex by an underground passage.

But far more important to principal architect Jean Paul Carlhian, of the Boston firm of Shepley Bulfinch Richardson and Abbot, was how to make the descent to the complex exciting and interesting.

"The notion of going down to view great works of art was unique," Carlhian says. "People go down to the cellar, down to a bargain basement, down to the subway, and down to

hell. I had to overcome those metaphors, and, without violating the existing Smithsonian buildings, create a willingness to go *down* to view the galleries."

He did this by enticing visitors to the street-level entrances. For the three-story education and office complex, this was the fanciful Kiosk.

Built on the Mall side of the 19th-century Haupt Garden, the small, round Kiosk, with its light and frivolous air reminiscent of a Victorian bandstand, leads down to the newly named S. Dillon Ripley International Center and Gallery, the 750-square-meter (8,000-square-foot) concourse, the education center, and the museum offices.

Statelier and more classical are the two pavilions that lead respectively to the National Museum of African Art and the Sackler Gallery. Intended by the architect to be "grand vestibules," they stand imposingly within the Haupt Garden but amid their own specially-designed theme gardens. The six-domed African Art pavilion, sheathed in a rosy pink granite, is approached through an extravagance of lush plantings and small streams splashing and spilling over rocks and along small waterways

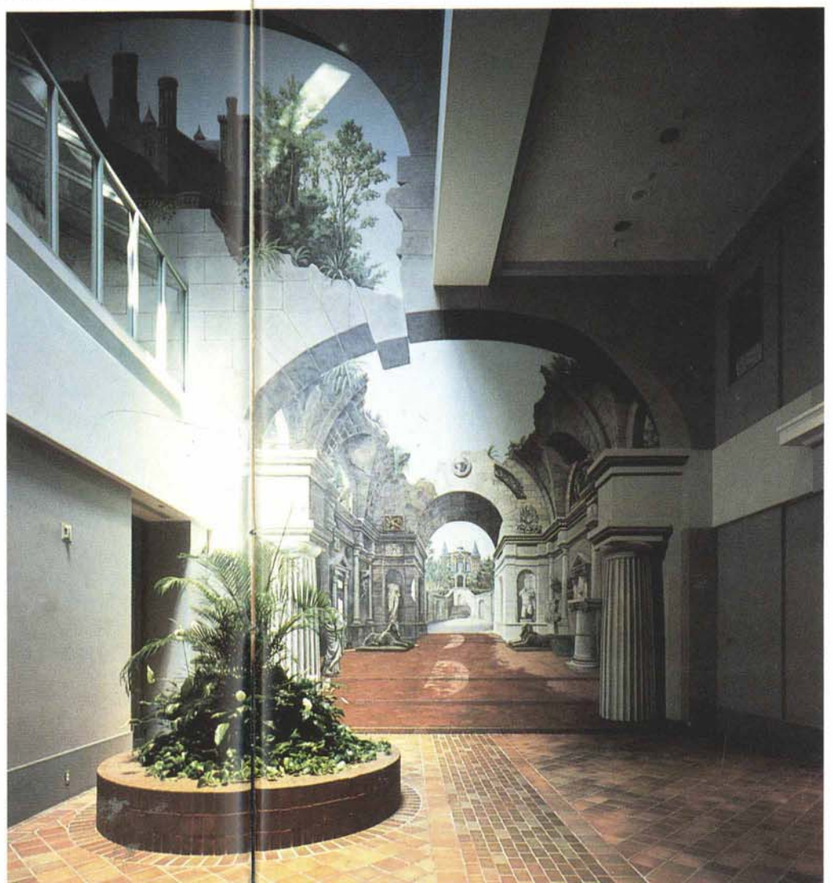
The gray granite-clad Sackler entrance pavilion, topped with six pyramids, offers a more meditative aspect. Here the garden presents a pair of matching 2.75-meter-high (nine-foot) granite moon gates and a shallow, circular pool divided by four stone walkways that lead visitors over the still water to the "perfect circle" in the center.

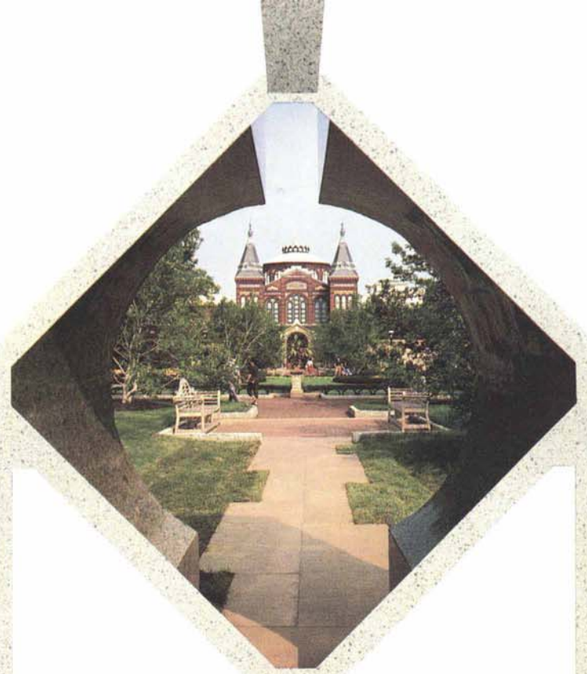
So inviting are all three of these entrances that the visitor is enticed from the street in sheer curiosity: What's inside these beautiful small buildings: Why are they here? What do they lead to? It seems natural to ask, and to wander in.

From inside, the pavilions look outward through long windows across their adjacent gardens, pools, and fountains to the much-loved Castle; they look inward to rich floor designs, soaring ceilings, graceful arches, and suspended stairways that seem to descend on a shaft of light.

There is light of all kinds: natural light from huge round or square windows; daylight from six enormous skylights that pours down stairwells and floods the three floors below; reflected light bouncing off tiled pools, dancing on ceilings and ricocheting from angled white walls; artificial light glowing softly from concealed sources in the ceilings and walls; hidden lights that illuminate display cases, gleam off glass and plexiglass, backlight the sculpture, and highlight the art. Part of the overall beauty of the complex is achieved by the interior architecture of the galleries, and the design of the exhibits; both are a collaborative effort by the Smithsonian's Department of Design and Installation. For the Sackler Gallery, the work was headed by Design Director Patrick Sears who, not without opposition from architect

The Kiosk leads to the museums' education and office complex (above), architect Jean Paul Carlhian (below), and an underground "illusionist" mural (right) that shows other Smithsonian buildings, including the "Castle" (above right) seen through one of the Sackler's moon gates.





Carlhian, supervised a two-year effort of staff designers, carpenters, cabinetmakers and electricians in creating "galleries and exhibits that hold magic when you get to them."

Who paid for all this magic? The United States Congress appropriated $36.6 million toward the new Smithsonian project, with the rest raised from Smithsonian trust funds and through gifts from corporations and individuals. One million dollars was forthcoming from the government of Japan, another million came from the Korean government; among the 38,000 other donors was the government of Bahrain.

Nonetheless, it takes more than money to make a museum. Although the National Museum of African Art had existed since 1964 in a collection of old townhouses around Washington, the Sackler Gallery of Oriental and Near Eastern Art came into being just this year through the largesse of one man.

The late Dr. Arthur M. Sackler – New Yorker, psychiatrist, medical researcher, publisher and art collector – was an ardent activist for the humanities, and recipient of numerous distinguished awards and appointments, among them the chairmanship of the International Committee for the Renaissance of the Egyptian Arts, Sciences and Humanities. "Art and science are two sides of the same coin," he once remarked. "Science is a discipline pursued with passion; art is a passion pursued with discipline. At pursuing both, I've had a lot of fun."

In 1982, Sackler agreed to give 1,000 masterworks from his personal art collection, and $4 million, towards the establishment of a new Smithsonian museum of Asian and Near Eastern Art. He invited Thomas Lawton, senior scholar of Asian art at the Smithsonian – and later director of the Sackler Gallery until shortly after its inauguration – to select $50 million worth of art from his collection; with Sackler's blessing, the selection grew to include objects with a total value

closer to $100 million. Chinese paintings, sculpture, lacquerware, jades and bronzes from Sackler's personal collection joined 247 pieces of ancient Near Eastern works in silver, gold, bronze, ceramic and minerals. Some of the most important of these are in the gallery's opening exhibits.

The 124 objects in the exhibit "Nomads and Nobility: Art of the Ancient Near East," consists of a number of outstanding works of the Achaemenid, Parthian and Sassanian empires of early Persia – empires that ruled the ancient urban centers of Mesopotamia between 550 BC and AD 651, and eventually expanded eastward to conquer all of Persia and Central Asia. They were later to challenge the eastward-expanding Roman Empire which, in time, began to influence their art and architecture.

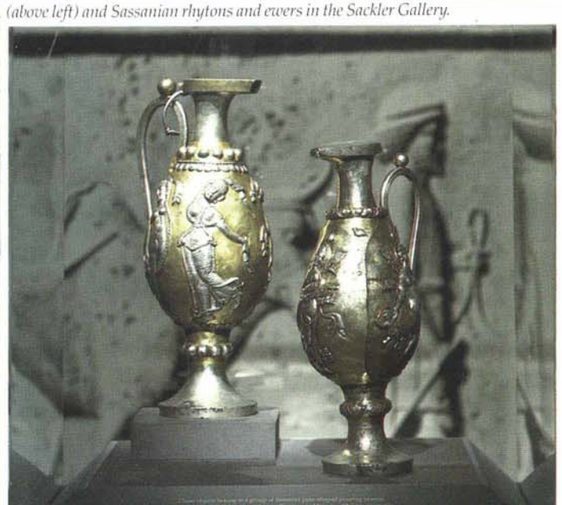
One of the four major installations marking the Sackler Gallery opening, this exhibit displays the sophisticated artistic and technical achievements of these societies. One section, on the manufacture of metal in the ancient Near East, establishes Mesopotamia, Anatolia, the Caucasus, and eastern Iran as the sites of the earliest use of metals, and the home of the subsequent development of the science of metallurgy. Throughout antiquity, metal-working peoples of this area produced the everyday objects of decorated copper and bronze, and the fine ceremonial objects of gold and silver, that now tell us a great deal about their unsurpassed skill and artistry, and much about their lives.

Outstanding in this exhibit are three silver rhytons – zoomorphic drinking horns – that date from the Parthian period. Seeming to float effortlessly inside their plexiglass display case, the heavy silver vessels can be viewed in the round, their intricate chasing and gilding illustrating only some of the impressive range of metalworking techniques practiced by these early craftsmen.

All three vessels have a cup which sweeps up in a polished curve of hammered silver from an animal-head

Winged lion on gold Achaemenid bowl (above), fine ceramics

(above left) and Sassanian rhytons and ewers in the Sackler Gallery.



base; one head has the shape of a bull, one of a lynx, and one of a lion. Another rhyton head, a Sassanian-period gazelle exquisitely fashioned in silver and gilt, has been adopted as the emblem of Sackler Gallery publications.

Also notable are the graceful pear-shaped Sassanian ewers, with elaborately gilded decoration depicting dancing figures – an influence from the expanding empires of Greece and Rome.

Noteworthy, too, is the gallery's unparalleled collection of Persian and Indian paintings and manuscripts. In a small gallery by itself is the long-lost collection of Henri Vever, a Parisian jeweler and art connoisseur whose nearly 500 masterpieces of Islamic painting, calligraphy and bookbinding were bought by the Smithsonian in 1986 for $7 million. In this rare collection are 15 miniatures dating from the 11th to the mid-19th centuries that glow and vibrate with color – thanks to the use of pigments made from malachite, lapis lazuli, cinnabar, gold and silver.

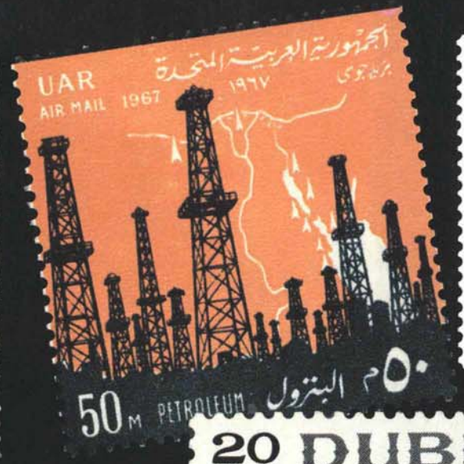
Also in this gallery are two folios from the Demotte *Shahnama* (The Book of Kings), considered the most important group of Persian paintings ever created. Mounted and displayed under special lighting, they share space with another important Persian work: the *Masnavi*, or Fifth Book of Jalal al-Din Rumi. This manuscript from 1459 – 44 folios and one precious double-page miniature – is executed on paper in opaque watercolor, ink and gold.

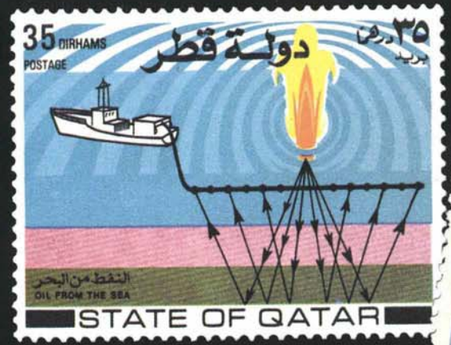
Two archival collections form part of the Near East library collection. In the Herzfeld Archives are field notebooks and drawings, plans and negatives of Persian and Middle Eastern architectural and archeological sites explored between 1879 and 1948. The Myron Smith Archives, 87,000 items in all, include 64,000 negatives, prints, and color and lantern slides taken during the more than 40 years that Smith served as an archeologist and historian in the Islamic world.

Many future exhibits are in the planning stages. What started out in the late 1960's as a call from former Smithsonian Secretary S. Dillon Ripley for "an increased international focus at the Institution" has already marked the beginning of a new era. The Smithsonian has become, as he envisioned, a university open to the world's use – a place where scholars, collectors, students, artists, travelers and museum enthusiasts can come to study and to learn.

"With the opening of the Arthur M. Sackler Gallery, the Smithsonian ... has become a world center for the study of the cultures of a vast portion of the world," Director Thomas Lawton said at the time of the inauguration. "For the first time, Smithsonian visitors may view changing selections of art treasures in settings designed particularly for them."

Aileen Vincent-Barwood, longtime journalist and former Middle East correspondent for the CBC, now freelances from upstate New York.





WRITTEN BY
RAYMOND SCHUESSLER
STAMPS FROM THE
AUTHOR'S COLLECTION

PETRO-

PHILATELY

Since 1919, more than 130 nations have released over 2,000 stamps detailing the complexities and the contributions of the oil industry. Some of the finest scenes are depicted on stamps from Arab countries, and trace the Middle East's growth as an oil-producing region.

The far-flung operations of the petroleum industry, and the diversity of its operations, make it an ideal and extraordinary subject for the philatelist who wants to specialize. Petrophilately offers greater challenges, greater depth and more byways and branches than most other philatelic specialties, and every day's newspaper brings the importance and currency of the industry to the attention of people around the world.

A portfolio of Arab countries' stamps portrays almost the entire process of bringing oil from the ground to its various end users: Seismic exploration, a national map dotted with derrick symbols, an offshore drilling rig, the pipelines, refineries and their components, and a tanker from Saudi Arabia are just a few of the designs.

Some of the most beautiful and detailed oil-industry stamps have been printed for Dubai – one of the United Arab Emirates – and Kuwait. In 1969, Dubai released a set of five stamps showing the installation of the world's first underwater oil-storage tank – a bottle-shaped structure used to store oil from offshore wells until it can be pumped aboard a tanker.

The history of oil on stamps is a reflection in miniature of how the modern industrial system operates, and how it

creates both new products and new demands for products as it grows. Cities spring up where there were none before, at first sustained by the nearby oil and gas fields but gradually developing independent, varied economies; petrochemical industries, secondary industries and shipping systems multiply the value of the raw product, which is used throughout the world. Ida M. Tarbell, daughter of a petroleum producer and muckraking author of the 1904 *History of the Standard Oil Company*, said, "The true value of an industry – especially oil – is not measured in dollars. It is measured by [its] services to the masses of men."

Financiers, nonetheless, can be included in a petrophilatelic collection. The legendary Calouste Gulbenkian is honored on a Portuguese stamp from 1965. His fabulous fortune derived from his role in forming the Iraq Petroleum Company, and it went to endow an equally fabulous museum in Lisbon (See *Aramco World*, September-October 1974).

Stamps from oil-producing countries also have purely practical advantages for astute collectors. They have been issued in relatively small quantities to indigenous populations that – until now – were not very interested in collecting them. Collectors in the rest of the world have also tended to neglect those countries. There are, as yet, few great rarities, so assembling a rich collection, and keeping it current as new issues appear, doesn't require a great expenditure of money. Yet increasingly, the oil industry is being recognized in such lands as Saudi Arabia as a part of the country's history; the rolls of local collectors are growing, supplies are tightening, and the value of scarcer items can only increase.

Some outstanding collections of oil stamps already exist, many made by present or former workers in the industry. A quarterly journal, published in Houston, reports new – and newly-discovered – issues to readers in 36 countries. It is even possible that the oil stamps collected today may bring more than just the pleasures of collecting in the future: As interest grows and the value of rare collectibles increases as a hedge against inflation, today's petrophilatelic collection may become a treasure for one's grandchildren. 🌐

Raymond Schuessler is a Florida collector of stamps from the Middle East.