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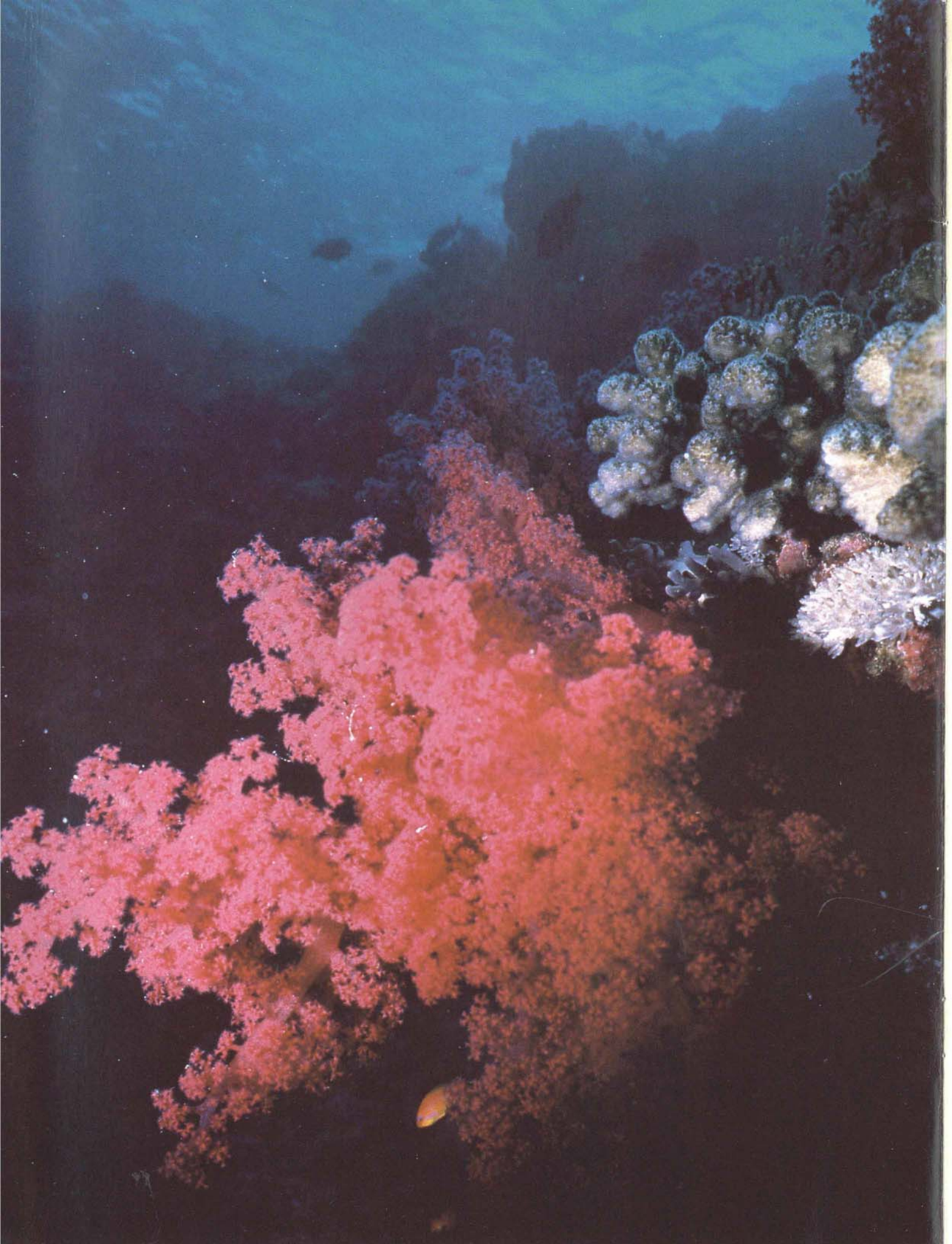
ARAMCO WORLD magazine

SEPTEMBER-OCTOBER 1980

Back to the Highlands



ARAMCO WORLD magazine

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REPRINTS OF SOME ARTICLES ARE AVAILABLE FOR CLASSROOM USE. REQUEST SAMPLES FROM THE EDITORS.

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By Torben B. Larsen

"But surely," they say, "there are no butterflies in Arabia!" There are, though – no less than 130 species: some of them nomads in constant search for the plants they need to survive and breed.

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Philby called it "the very backbone of Arabia" and Thesiger described its "graceful, laughing people." This is 'Asir – fertile, cool, and scenically magnificent.

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By Raymond J. Connor

Every spring, on Karan Island and other empty patches of sand in the Gulf, the swift tern, a shy, noisy and lovely addition to the Gulf's known breeding species, comes to play, to feed and to raise its young.

CONNOR

Published by Aramco, a Corporation, 1345 Avenue of the Americas, New York N.Y. 10019; John J. Kelberer, Chairman of the Board and Chief Executive Officer; Hugh H. Goerner, President; J. J. Johnston, Secretary; Nabil I. al-Bassam, Treasurer; Paul F. Hoye, Editor; Robert Arndt, Assistant Editor. Designed and produced by Motivation Techniques Limited. Printed in England by Ben Johnson & Co. Ltd. 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. Correspondence concerning Aramco World Magazine should be addressed to The Editor, 55 Laan van Meerdervoort, 2517AG The Hague, The Netherlands. Changes of address should be sent to Aramco Services Company, Attention S. W. Kombargi, 1100 Milam Building, Houston, Texas 77002. ISSN 0003-7567

Cover: 'Asir, a province of Saudi Arabia, encompasses coastal plains, fertile farms and barren valleys strewn with rock. But its glory is the breathtaking beauty of its mountains: great peaks, deep gorges, foaming torrents and quiet forests, all, by this autumn, part of the kingdom's first – and magnificent – national park. Photo by Tor Eigeland. Back cover: One of the Arabian Peninsula's 130 species of butterflies which have, over the centuries, adapted to the arid terrain and harsh temperatures of the region. Photo by Torben B. Larsen.

◀ Red Sea currents flow around brightly colored bouquet-like formations of soft coral *(Dendronepthya)* growing on Shi'b al-Kabir Reef northwest of Jiddah.

Above, the Arabian mistletoe butterfly (Mylothris arabicus)*, a species so far found only in Abha and two places in North Yemen. Right, the painted lady* (Vanessa cardui).

For butterflies, as for Bedouins, nomadic life is harsh...

A Painted Lady

WRITTEN AND PHOTOGRAPHED BY TORBEN B. LARSEN

As a specialist on the butterflies of Arabia, I am accustomed to people saying, "But surely there are no butterflies in Arabia!" In fact the Arabian Peninsula is full of butterflies: no less than 130 species.

It is true that the majority of these species live in the mountainous regions – 'Asir, Yemen, Hadhramaut, Dhofar and northern Oman – but even the desert regions have their permanent residents. Both H. St. John Philby and Bertram Thomas caught specimens right in the heart of the Rub' al-Khali, Saudi Arabia's vast sand desert – species such as leopard butterflies.

More importantly, Arabia, standing as it does astride the zone of contact among three of the major zoological regions of the world – the African, the Oriental and the temperate – is, for fauna, a crossroads.

Like the fauna of any area, Arabian butterflies are the result of two factors: where they originated and how they adapt to the climate. Because the climate of Arabia fluctuated considerably during the last two million years or so, the composition of the butterfly fauna varied accordingly. As recently as 7,000 years ago (See *Aramco World*, March-April 1980), Arabia had a cooler, more humid climate, and though conditions have since become more rigorous, many of the species which first appeared in Arabia – or "colonized" Arabia, as lepidopterists say – still survive. They provide living testimony to the successive waves of colonization which took place so long ago.

A million or so years ago, for example, the temperate fauna of the Himalayas made contact with those of the African highlands, and in Yemen still there exist a few butterflies which were established then. The small copper butterfly is one example; it has been separated for so long from other populations of the same species that it has acquired a special color pattern. As a result, a small copper from Yemen can be told from other small coppers at a glance. Much more recently, there was contact between the fauna of the Omani mountains and those of neighboring Iran – as proved by the discovery of the white banded rockbrown species in Oman a few years ago; it does not differ at all from the form which flies in Iran and Baluchistan. I am certain that in more humid times there must have been more species of this group in Oman, but increasing aridity and temperature forced them into extinction. It is almost possible to imagine how they were gradually pushed up the mountains in search of cooler and moister climates till they finally had no option left and disappeared, almost literally, into thin air.

The temperate-region butterflies, however, are no longer the most prominent component of the fauna. For the peninsula as a whole, it is the desert-adapted species and those of tropical origin which hold pride of place. The desert species – such as the desert white – are by no means numerous, but they are the *only* residents of the driest regions and their finely tuned survival mechanisms are fascinating.

Some butterflies, for example, spend several years as pupae – that is, in an immobile and non-feeding stage – waiting for the day when conditions are right for breeding; they then emerge and mate and lay eggs; in a matter of weeks the next generation also reaches the pupal stage. And some members of the blue butterfly family turn into cannibals if food supplies dry up, thus ensuring that at least a few specimens survive even the most disastrous season.

As to the tropical species of butterflies in Arabia, most are allied to butterflies of the African region, though there are a few species of Asian origin as well. *Papilio demodocus*, for example, is an African

Left, the striped white butterfly (Euchloe belemia), *found on Arabia's east coast from Dhahran to Cape Musandam.* *Right, the African lime swallowtail* (Papilio demodocus).

Left, the small cabbage white (Pieris rapae). *Right, the Arabian form of the small copper* (Lycaena phlaeas shima). *Opposite the Asian lime swallowtail* (Papilio demoleus).

butterfly which is common from Jiddah to Aden and Dhofar; the almost identical *Papilio demoleus* is common in oases in eastern Arabia, but its main population is spread all over Asia and Australasia. Furthermore – a fascinating fact – their Arabian distribution does not overlap as far as lepidopterists know. Some of the species of African origin have managed to penetrate as far east as India and Burma, but the majority are limited to southwestern Arabia. There is evidence that the African species of butterfly in Arabia are the survivors of several invasions, some of which probably date back a very long time; certainly a number of species have been isolated in Arabia long enough to develop into distinct species; related to African species, to be sure, but clearly distinct. The Arabian mistletoe butterfly is a good example.

Each of these groups of butterflies tends to be linked to special ecological conditions, especially to plants, and many have become closely adapted to a special environment. Thus the striped white is a temperate species which, in Arabia, is only found along the east coast, but has a desert counterpart which is almost indistinguishable. The range of these two species in Arabia does not overlap at all.

There are also butterflies, however, which have *not* specialized, yet also survive. They are the migrant species and their survival strategy is based on mobility. Put in simple terms, they're nomads who travel endlessly in search of conditions where they can breed.

One example is the painted lady, the world's most cosmopolitan butterfly. When this species has a successful brood, individual butterflies fly off in all directions and may travel thousands of miles. Thus if some wadi in central Arabia is suddenly blessed with an abundance of rain, some specimens of the painted lady will almost surely come across it, breed and lay their eggs. But their progeny will in turn leave the wadi, so if the wadi is not suitable for breeding again for many years, it won't matter; the progeny will have found still other places to breed.

Obviously many butterflies die in such a process; for butterflies, as for Bedouins, nomadic life is harsh. But the species will survive.

There are also less regular migrants than the painted lady. Small cabbage whites, for example, often invade the oases of eastern Arabia in the spring; although they are all finally killed off by the extreme heat of mid-summer, they breed first.

Characteristically, the painted lady and other migrants are less specialized in choice of food plant and ecological conditions than most of the sedentary species. They can't be as fussy and survive. And as a general rule migrant species – or species with considerable powers of dispersal – predominate in the harsher environments. Probably half the butterflies found in and around Riyadh are more or less dependent on migration for survival.

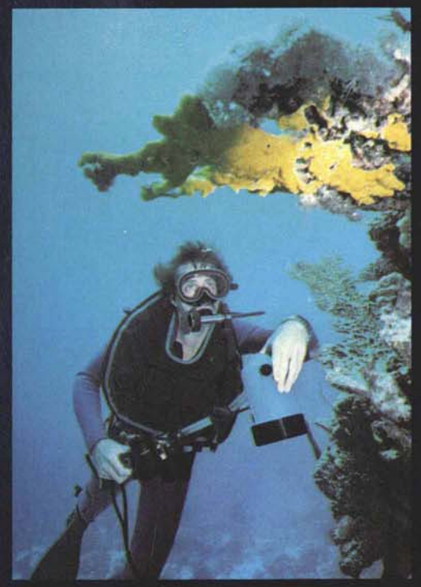
Butterflies, then, not only exist in Arabia, but flourish. And because they, like other fauna – and flora – in Arabia have learned to survive, they are of extraordinary interest to the zoologists and ecologists working on the secrets of the Peninsula's natural history.

Torben B. Larsen, a Danish economist, is the author of Butterflies of Lebanon *and* Butterflies of the Sultanate of Oman. *He has discovered 12 new species and has written 30 papers on Middle Eastern butterflies.*

Before they must, and while they can, the Red Sea countries are taking action...

To Save a Sea

WRITTEN AND PHOTOGRAPHED BY GUNNAR BEMERT



There are, in the world, several coral seas: the waters around the Great Barrier Reef northeast of Australia, the Caribbean and the vast region called the Indo-Pacific. But the Red Sea, in some ways, is unique. For one thing, it *is* red – in some places and on some occasions.

Theories on why it's red – or seems red – abound. One is that the sun, reflecting off the mountains by the Sinai coast, casts a reddish tone across vast stretches of the sea.

But the real reason – or at least the reason accepted by science – is that masses of tiny red one-celled creatures called dinoflagellates, a type of plankton, occasionally float to the surface and in daylight hours tint the water the shade of tomato soup.

The Red Sea is different in other ways too. It is the only fully enclosed tropical coral sea (the Arabian Gulf is not considered a "sea") and is surrounded by countries where a subtropical climate and deserts prevail. With no permanent rivers to feed it, the flow of water into the Red Sea comes entirely from the Suez Canal to the north, and from the narrow passage to the Gulf of Aden. Thus its supply of fresh water is scanty, and since evaporation is high, the Red Sea – over four percent salt – is one of the saltiest in the world. Last, much of its marine life is unique. The Red Sea is home to numerous species of fish and other organisms found nowhere else in the world, and its coral reefs are among the most beautiful and extensive anywhere.

Darwin, in *The Origin of Species*, wrote that there are basically three types of coral reef: fringing reefs, atolls and barrier reefs, all built by billions of tiny polyps of the limestone armor they secrete from their own bodies – and all represented in the Red Sea.

The type closest to the shoreline is called a fringing reef, which, characteristically, runs parallel to the shore and, north of Jiddah, is very typical: it has a distinctive edge and a "drop-off" about 300 feet out from the shoreline. Toward the shore, within the reef, there is a shallow lagoon, its bottom mostly sand, dead coral and rock and its water temperature slightly higher than outside the reef. Toward the edge of the reef, where the depth is about 20 inches, the live coral begins to grow; because they need sunlight, the coral polyps cannot live in depths greater than 165 feet even in very clear water. Then, at the edge, the reef suddenly drops off to depths of between 40 and 80 feet and appears to be a solid wall. But that's not so; the wall consists of more than 100 species of coral, some "hard," but some "soft."

The second kind of reef is the atoll, which occurs further out from the shoreline, but still in relatively shallow water. Mostly circular in shape, atolls enclose shallow lagoons, occur frequently in clusters and have an outside wall of live corals.

The third kind of reef is the barrier reef, normally the farthest reef offshore before deep water, and made up of a chain of coral reefs, connected to each other to form one huge solid reef stretching for miles – as Australia's Great Barrier Reef does – and dropping off to depths of between 325 and 1,000 feet.

Over the 300,000 years since the Red Sea was last connected to the Indian Ocean, these reefs and their attendant marine life have developed in nearly complete isolation – one of the reasons why up to 20 percent of species found in the Red Sea are found *only* there. They have developed, furthermore, with virtually no interference from man until recently. Although it has been a valuable shipping route, particularly after the Suez Canal was completed, the countries bordering the Red Sea – Egypt, The Sudan, Ethiopia, Yemen and Saudi Arabia are the main ones – are lightly populated along the shores and only a few have any large ports. In Saudi Arabia, nevertheless, concern is growing that pollution might one day destroy the reefs and

the fantastically beautiful creatures that live there.

This is not, it should be said at once, an imminent danger. At present the Red Sea is almost totally free of pollution, and the conditions which turned, or are turning, the Great Lakes and the Mediterranean into vast sewers do not apply.

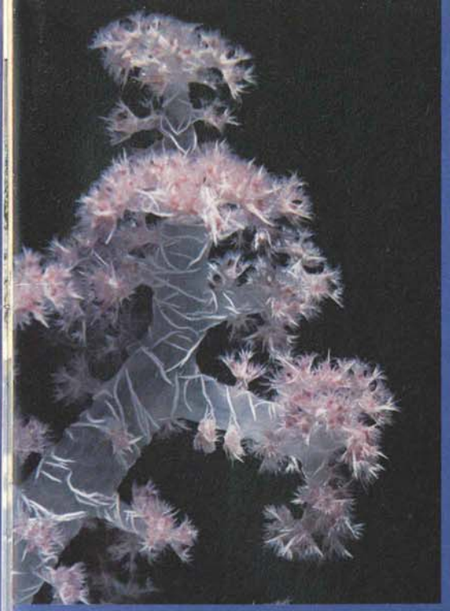
Upriver land mismanagement, for example, which leads to siltation on coastal reefs, is ruled out since little rain falls in the area and no significant permanent rivers enter the sea. Moreover, dry conditions allow little agriculture in the coastal areas – thus reducing the runoff of pesticides or other agricultural chemicals which have been so harmful to other bodies of water.

On the other hand, the Red Sea is extremely vulnerable. Because, like the Mediterranean, the Red Sea is enclosed, any pollutants that do get into it will stay there; there are virtually no tides or currents to flush them out, nor rivers to dilute them. The governments of Saudi Arabia and other coastal countries, therefore, are already beginning to worry about the potential dangers involved in industrial development along the shoreline, and in increased shipping.

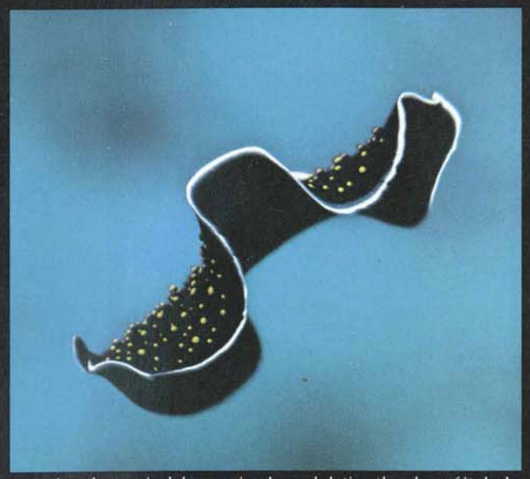
Already, in fact, some effects of increased shipping have been seen. Since the 1976 reopening of the Suez Canal (See *Aramco World*, September-October 1975), traces of garbage and oil have been noted and as expansion continues, observers fear, this will get worse. Even now, delays at some Red Sea ports sometimes force ships to wait outside – with a consequent increase in discharge. And when Saudi Arabia completes two new refineries with oil-loading terminals, now under construction at Yanbu', close supervision during terminal operations will be vital to prevent spillage.

In addition, there is the danger of shipwrecks and collisions. The Red Sea is notorious for its navigational difficulties and dangerous reefs; thus when tanker traffic expands, additional care will be necessary to guard against collisions and navigational hazards.

As to industrialization, development in several coastal countries is proceeding rapidly; several modern ports and industrial cities are being built. But ports and new installations are often placed on the natural creeks and coves which occur on both sides of the Red Sea and are very likely to be important spawning and nursery grounds for fish, shrimps and other forms of marine life.



The long, narrow trumpet fish (Fistularia petimba) *at far left is hard to see head-on as it stalks its prey, but its mouth can open into a funnel shape to engulf small fish. Opposite page, center, a diver photographs a typical branching coral formation. This page, left, a water-filled soft coral, its fleshy structure stiffened by hard spiny mineral "ribs" and, right, a jewelfish* (Anthia squamipinnis), *which can change from female to male in the space of a few days. This is the male fish. Below, a silver-tip shark* (Carcharias albimarginatus) *cruises along the reef.*



One brightly colored reef fish is the royal angelfish (Pygophytes diacanthus) *at left. Right, a flatworm less than an inch long swims by undulating the edges of its body.*

The clownfish (Amphiprion bicinctus) *lives unharmed among the tentacles of a poisonous sea anemone. Its yellow and white banding warns predators of the anemone's sting.*

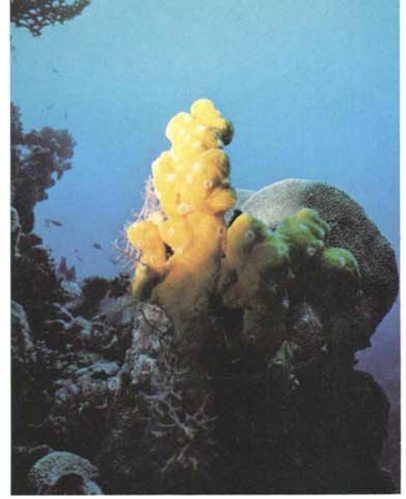
In coastal cities, meanwhile, rapidly growing populations have, in some cases, resulted in the discharge of sewage directly into the sea. The same is true of suburban residences and vacation homes now being built along the coasts from many cities. As most of the coast is enclosed by the fringing reef, and as there is little tidal action, such wastes are flushed from the lagoon at a slow pace. At some point the reef corals are bound to be affected.

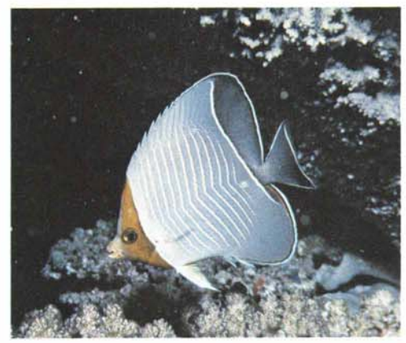
Another threat arises, ironically, from the incredible beauty and variety of the Red Sea's marine life. Drawn by reports of colorful reefs teeming with fish, skin divers, scuba divers and shell collectors have begun to range the coasts in alarming numbers. Added to the losses from small reef-based industries – such as the collection of shellfish (*Trochus niloticus*) for mother-of-pearl and black coral for jewelry – and the use of conch for food, this incursion might already be affecting the delicate ecosystem.

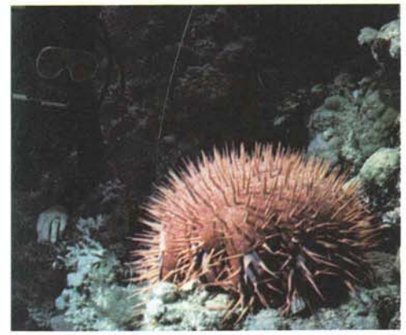
In Jiddah, furthermore, the population is already so large that it has had an impact. Fishermen for example have already used up the area's modest stock of spring lobster, a local favorite; close to Jiddah there are virtually no more. And observations in a recreation area north of Jiddah, suggest that the populations of predatory fish such as groupers and coral trout, and of branching corals such as *Acropora* and *Stylophora* – and thus of small fish, like angelfishes and butterfly fishes, which shelter in them – are all lower than in most comparable reef areas. A further effect, often overlooked, is that swimmers, divers, and outboard engine propellers stir up sand that settles on the coral, blocks the sunlight needed and kills it. This appears to be happening, to some extent, in Sharm Obhor.

Again, the situation today is far from critical. Nevertheless, the countries bordering the Red Sea and the Gulf of Aden have already begun to develop a regional marine environmental program under the auspices of the Arab League Educational, Cultural and Scientific Organization and of the United Nations Environment Programme. Furthermore, the International Union for the Conservation of Nature and Natural Resources has been asked to help establish a network of marine reserves throughout the region. And in January 1976, those organizations agreed on a program for protection of the Red Sea's marine environment.

The foresight evident in such meetings has already led to establishment of a national marine park covering the major part of the Dahlak Islands off Ethiopia, and in The Sudan marine conservation is well on its way. Spearfishing is now banned,







From top downward: a colony of bright yellow sponges growing on a coral rock formation; a brown-faced butterfly fish (Chaetodon larvatus) *– a species unique to the Red Sea – pecking at the coral polyps it feeds on; photographing a sponge colony; the crown-of-thorns starfish* (Acanthaster planci) *"grazing" on live coral.*

certain areas have been set aside as marine reserves and, in areas where tourists are welcome, breaking and collecting coral and shells is prohibited. In some particularly popular spots, the Sudanese government has even provided permanent moorings for divers' boats to prevent the destruction of corals by anchors. Saudi Arabia, meanwhile, is opening a national park that includes part of the Red Sea shoreline and coral reefs (See page 22).

Saudi Arabia, North Yemen and The Sudan have also taken steps to protect fishing in the Red Sea. Even though, so far, only the Egyptian waters have been heavily fished, those countries have launched major fisheries development programs of their own and are working toward protecting potential spawning and nursery areas that must be preserved if the fisheries are to succeed.

Without question, these precautions are wise – if only because it is much easier to enact conservation measures *before* industrial organizations and businesses have invested large sums in a given area. In addition, environmentalists say, even environments managed solely for man's benefit should incorporate extensive areas free from development and available for recreation, such as now exist in the Red Sea region.

To insure the survival of an ecosystem as fragile as the Red Sea's, of course, the countries around it will have to do still more, particularly as development proceeds. They must, for example, prevent overfishing, continue to protect spawning grounds and restrict spearfishing. They must control waste and sewage disposal, establish marine laboratories and protect such particularly vulnerable species as the dugong, the manta ray, the whale shark and all the turtles. Finally they must, in the remote and as yet untouched areas, establish large marine parks, equivalent to biosphere reserves, where a large group of species and marine biotopes functions as an ecosystem.

As the near destruction of the Great Lakes and the gradual destruction of the Mediterranean show, such measures are vital if the enchanting beauty of the Red Sea – suggested in these photographs – is to be preserved for the generations to come. Fortunately for those generations, some leaders, in Saudi Arabia and elsewhere, have already demonstrated their willingness to take such steps – and to do so before it's too late.

Gunnar Bemert has lived in Jiddah for five years where, in cooperation with the Ministry of Information, he and Rupert Ormond have written and photographed Coral Reefs and Marine Life of Saudi Arabia and the Red Sea, *which is scheduled for publication this year.*

Back to the Highlands

WRITTEN BY TOR EIGELAND WITH PAUL LUNDE PHOTOGRAPHED BY TOR EIGELAND MAP BY MICHAEL GRIMSDALE

'Asir, the southwestern province of Saudi Arabia, is one of the most breathtaking regions in the kingdom. Stretching from the town of al-Nimas, south of Taif, to the frontier of North Yemen, it includes a narrow strip of the Red Sea coast, a chain of mountains up to 9,000 feet high and a variety of tribes described by explorer Wilfred Thesiger as a "graceful, laughing people."

Thesiger is dead right. From sea level to mountain top, the peoples of 'Asir are happy, casual and relaxed—a result perhaps of their life in a region that is fertile, cool and scenically magnificent.

Seven years ago, during my first trip there, I jotted down some first impressions of 'Asir, one of which said it all: "This green, mostly mountainous region is God's own country. Till very recently untouched by the world in general, and tourism and oil in particular, 'Asir is as close to Shangri-la as anything I have seen."

Later notes confirmed this initial enthusiasm. "Every mountain village in 'Asir has a different character – and a different color – all of a dreamy beauty. In one, brown was the basic color: two or three-story houses with brown mud walls slanting slightly inwards to the crenelated roofs, and every window and the top of the walls painted white. Like a cake with frosting on top.

"In the next village the white frosting was the same, though the walls had layers of slate jutting out as protection against the rain, and broad stripes of brown and white. And in the village beyond that, each house was painted a different color. It was wild and bright, yet oddly consistent."

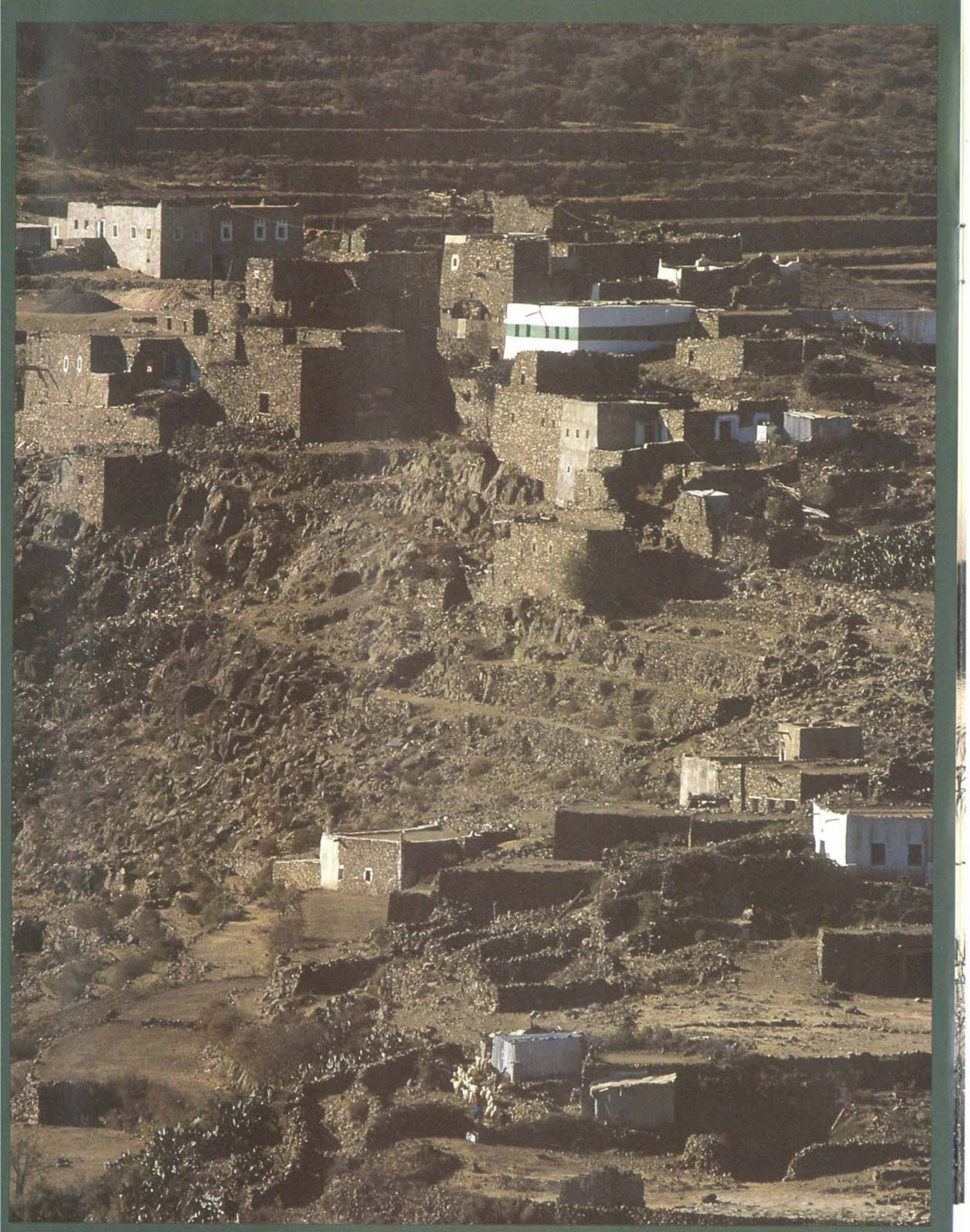
Reviewing those notes recently, prior to a second visit, I wondered how much 'Asir had changed, as, like the rest of the kingdom, its cities, its roads and its economy reacted to the impact of development programs.

During the past 10 years, I reflected, development programs have been reshaping 'Asir. In 1971, for example, the province had 154 schools; it now has more than 400 – 200 of them for girls – and the educational budget has grown from about $1,300,000 in 1971 to about $130 million in 1978. As another example, there were only about 140 miles of paved road in 1954; now there are more than 900.

On arrival it seemed that there *were* changes. In Abha, I immediately noticed a new airport, rows of new buildings, a new school and, overlooking a new dam, a new hotel with tennis court and swimming pool.

There was other evidence too. Five years ago when you left Abha, you were immediately in the country, but now Abha goes on and on, and the traffic is quite incredible. Where there was once a narrow road there is now a four-lane highway, and development sprawls over the countryside for miles.

'As close to Shangri-la as anything I have seen'



But I needn't have worried. 'Asir is being developed under the careful guidance of its amir, Prince Khalid, a son of the late King Faisal, and he, in accordance with his hope of five years before, has seen that the new planners and architects respect the traditions of the past. There are changes, yes; but architecturally at least, and in its cheerful heart, the 'Asir of today is much like the 'Asir of history.

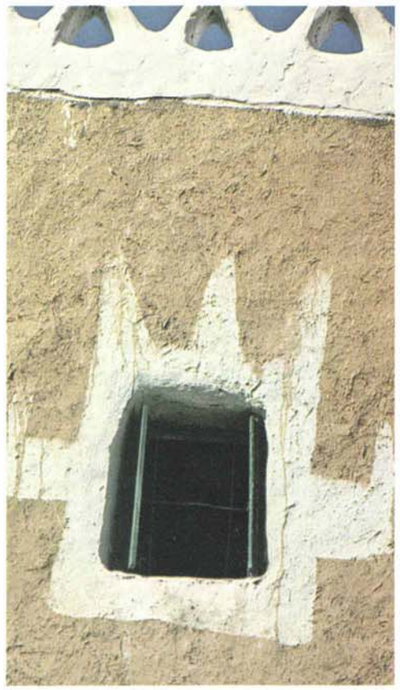
Because, until recently, few Westerners ever reached 'Asir, that history is not well known in the West. Indeed, until the 1930's, when H. St. John Philby explored the area, 'Asir was virtually unknown. Yet 'Asir, even in ancient times, was important.

In 25 B.C. Aelius Gallus marched his legions south from Egypt on a 1,300-mile expedition to take control of the ancient overland trade routes between the Mediterranean and what is now Yemen and Hadhramaut. The Romans wanted control of those routes because they were desperate for money and hoped to raise some by capturing Marib, capital of Yemen, and taking control of the trade in incense – then a priceless commodity – and other valuable aromatics. As it turned out, however, the expedition was a disaster (See *Aramco World*, March-April 1980) and little information about 'Asir emerged.

Muslim historians, naturally, provide most of the information about the early periods in 'Asir and neighboring areas. They mention, for example, the city of Najran: near the site of the Romans' only major battle during their invasion, later seat of a Christian bishopric and the scene of a massacre when Dhu Nuwas, king of the Judaized state called Himyar, provided the first martyrs of Arabian Christendom at al-Ukhdud, not long before the birth of the Prophet Muhammad.

It was also at Najran that Bishop Quss ibn Sa'ida – famous in Arabic literature – composed the prayers and orations, carefully preserved by Muslim historians, which have earned him the title of "the Cicero of the Arabs." And when the Abyssinians invaded South Arabia it was at Najran that they established themselves and from which, in 570, the year of the Prophet's birth, they launched an attack on Mecca using elephants. Their route through 'Asir is still known as the *Darb al-Fil* – the Path of the Elephant.

Later, with the advent of Islam, the tribes of 'Asir embraced Islam; Muhammad himself signed a treaty with the Bishop of Najran in which, on payment of tribute, the Christian community was granted religious freedom. But then, as the political center of the Muslim world shifted to



Damascus and Baghdad, the attention of historians shifted too. As a result, the history of 'Asir and its peoples in the subsequent centuries is obscure. It was not until the beginning of the 19th century that the region again assumed a prominent role in the history of the Arabian Peninsula, when Muhammad Ali, the new ruler of Egypt, invaded Arabia.

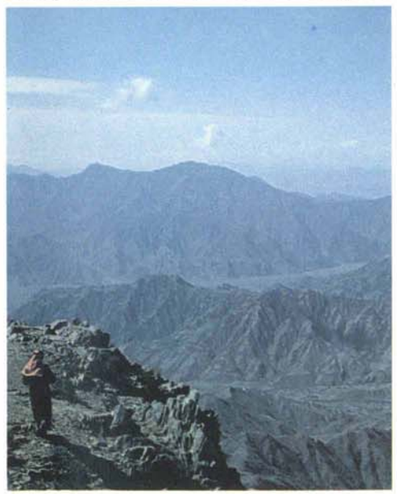
Opposite, the mountain village of al-Ghoz climbs step-wise up the slope. Above, merchants in Khamis Mushait discuss the quality of their wares and stonecutters near Najran hammer in their "musical" wedges. Top right, whitewashed designs and crenelations decorate many 'Asir houses. Right, a different construction style in a village near Dhahran.

Because, earlier, tribesmen of 'Asir had joined the House of Sa'ud in an 18th-century religious revival – which led the Ottoman Sultan to send Muhammad Ali to Arabia – the Egyptian forces repeatedly sent forces into 'Asir between 1818 and 1839. And since Muhammad Ali's forces included a handful of European technicians, the West began to get its first trickle of information about 'Asir: verbal and written accounts which enabled European cartographers to enlarge on data which hadn't been updated since the days of Ptolemy.

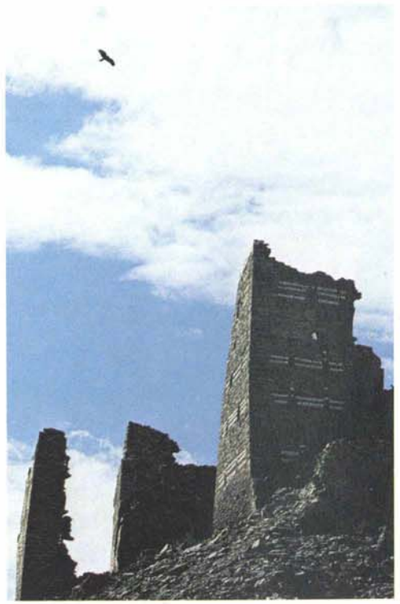
When the Egyptian forces withdrew from Arabia in 1839 – the same year the British occupied Aden – the 'Asir highlands were left in the hands of a local dynasty. But when that dynasty extended its control to the Tihama – the Red Sea coastal strip – and its important ports, the Ottomans intervened once again, attached 'Asir to the Ottoman *vilayet* of Yemen, and established a governor in Abha. And though the Ottomans never succeeded in extending their power much beyond Abha itself, 'Asir, as part of Yemen, remained in the Ottoman Empire for 40 years.

By 1920, however, 'Abd al-'Aziz, founder of Saudi Arabia, had begun to recoup the losses of the House of Sa'ud and to unify most of the Peninsula under his rule. As part of this campaign, he sent his young son Faisal – later king – with an expeditionary force to occupy 'Asir, and from then on 'Asir was controlled by the House of Sa'ud – a situation formalized in 1934 with the signing of the Treaty of Taif between Saudi Arabia and Yemen.

Even then the region was still largely unknown to the West. In 1932, H.St. John Philby, one of the first Europeans to explore



At top, a hawk circles above a ruined fortress at al-Fayeh. Above, looking into the valley from atop Dhahi Mountain.

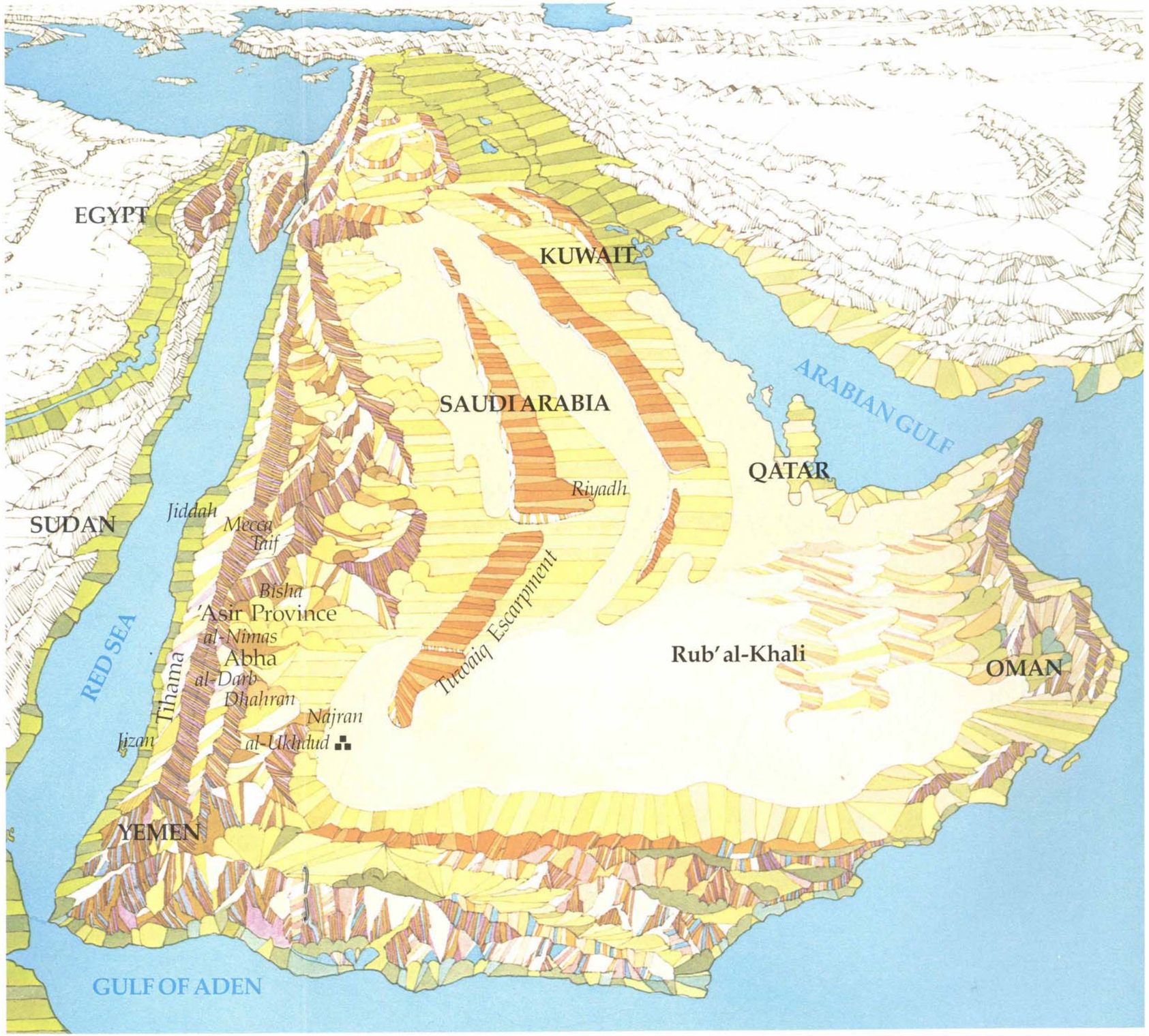


and map the Peninsula, did enter 'Asir, but as he didn't publish his observations until 1952, the area remained one of the blank spots on the world's map.

As he always did, Philby described "the fabled highlands" in numbing detail: the zigzagging roads, the crumbling Ottoman forts, the great flat boulders inscribed with pre-Islamic scripts, the *jabals*, the trees, flowers and birds, the customs and costumes, the crops and – as one Philby critic put it – "all those damned *wadis*."

Although he was far more geographer than poet, however, Philby was not insensitive to the rugged beauty of 'Asir. In writing about Abha's "great ridge of mountains," for example, Philby calls it "the very backbone . . . of Arabia" and goes on to add an enthusiastic description of the walls of rock, the jagged peaks, the rounded summits, the tumbled boulders and the torrents, gorges, abysses and buttresses – "a grand but forbidding scene."

Which, I discovered, it still is. Despite the construction projects that are visible everywhere around Abha, the mountains of 'Asir are as magnificent as Philby first found them. Harsh and barren, yes, but, as Philby said, grand – particularly in the morning when the sun rises over the peaks. There's a mist, of course, but at dawn the cool breezes swiftly disperse it and when the sun comes up the air is so clear that the sky simply reddens slightly then bursts into clear, almost white, sunlight as, over the escarpment, fantastic cloudbanks, forced upwards by hot air from the Red Sea, billow into the sky.



Not far from Abha is a village called al-Habbala, "the rope village," so named because the villagers once lived in a 600-foot-deep gorge and got most of their supplies by a rope and pulley on the ridge above. There were 60 families still living down there when I went to see al-Habbala and some of them immediately began to shout, "Don't throw rocks at us!" Apparently visitors had been lobbing rocks over the spectacular drop, inadvertently endangering the families below.

Al-Habbala, I've since learned, was the refuge, 300 years ago, of some 'Asir tribesmen seeking safety. Finding a well-watered place at the bottom of the gorge, they settled there and built the village where their descendants lived until recently; not long after my visit Prince Khalid built a new village for them.

Elsewhere in the province, I continued to find that odd mixture of barren aridity and blooming fertility. Enroute to Najran – actually a separate district – I visited Dhahran – 'Asir's Dhahran – and found villages that are incredibly beautiful. But almost immediately we descended to a monotonous deserted plain. It too is lovely but, as Philby said, in a forbidding way: mountains in the distance; clusters of tamarisk trees; rocks weirdly sculptured into mushrooms; Bedouin tents, the color of light camel hair; the earth a strange rust red; and great boulders strewn across the land, a shiny volcanic black. Then, in the Najran valley, the scene shifts dramatically again: to banana plantations, coconut palms, date palms, fields planted with durra and alfalfa and citrus orchards alive with oranges, tangerines and lemons.

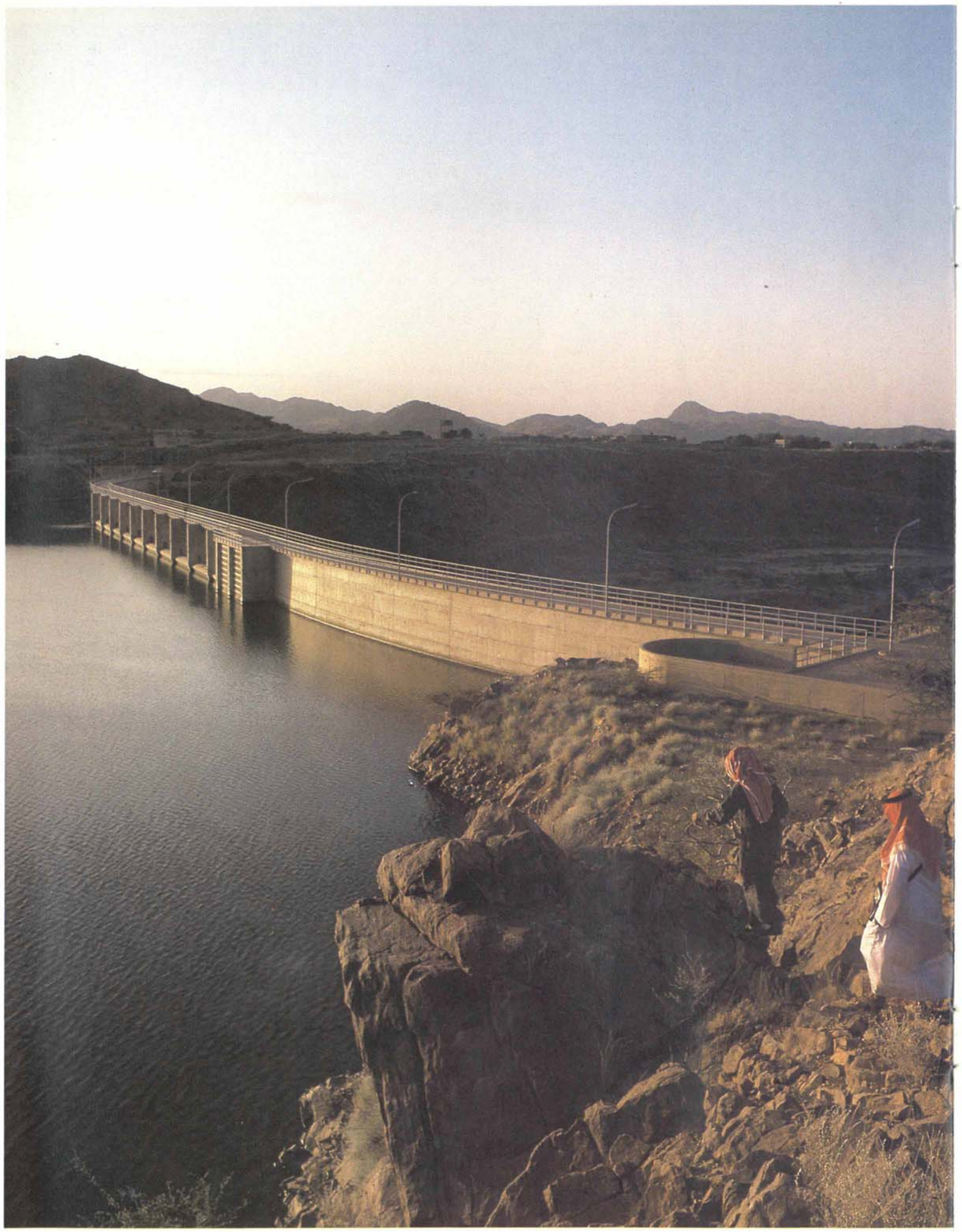
Najran itself is a huge sprawling place, part town, part farm, half modern, half ancient; and on the outskirts I came across some remarkable stone-cutters in a remote quarry. Engaged in cutting slabs of stone to decorate the facades of buildings, they first drill holes in the rock, then insert iron bars and drive them in with sledge hammers in a melody of different notes from each bar.

Then there's Jizan in the Tihama, the coastal plain, once described (See *Aramco World*, January-February 1974) as "ugly, mosquito-ridden and humid," but now a symbol of Saudi Arabia's efforts to take full advantage of 'Asir's natural fertility.

North of Taif, the western coast of Saudi Arabia is dry. But as the highlands lie just within the range of the monsoon rains, 'Asir receives some 11 inches of rainfall a year – enough to make it the most fertile agricultural region in the kingdom. From earliest times the inhabitants of 'Asir have cultivated a wide variety of crops. Using terracing and catchment dams, they grew fruits such as grapes, peaches, apricots, limes, oranges, lemons and mangoes, wheat and other cereals, as well as such important cash crops as sugar, indigo and coffee. 'Asir was so fertile, in fact, that it contributed to the classical geographical notion of *Arabia Felix* ("Happy Arabia").

At left, part of the 2.5-billion-cubic-foot reservoir created by Wadi Jizan Dam. Above, al-Fayeh village clings to its crag.

Despite the hard work and ingenuity of the ancient inhabitants, however, much of that rainfall, over the centuries, was lost as, in torrents, it poured down the wadis in incredible flash floods that washed away topsoil, uprooted crops, drowned livestock and then, uselessly, sank into the sands. In 1967, therefore, Saudi Arabia took its first step toward harnessing the streams; the government, with U.N. help, started to build a dam between two ridges 30 miles east of Jizan.



As dams go, the Wadi Jizan Dam was a modest effort: 1,000 feet across, 133 feet high. But when it was completed in 1971, it not only provided irrigation for some 3,000 acres of land, but also signaled the start of construction on an interlocking series of irrigation and development projects that will increase the output of sorghum, a key food, and may enable farmers to grow corn, peanuts, sugar cane, cotton and papaya – as well as eucalyptus and tamarisk trees, key weapons in the kingdom's endless struggle to contain advancing deserts.

Near Wadi Jizan, the impact of the dam is already visible – in the cool waters of the reservoir and in the gardens bright with tomatoes, beans and okra – but on the coast there was still more activity as a French firm drove towards completion of a new and modern port.

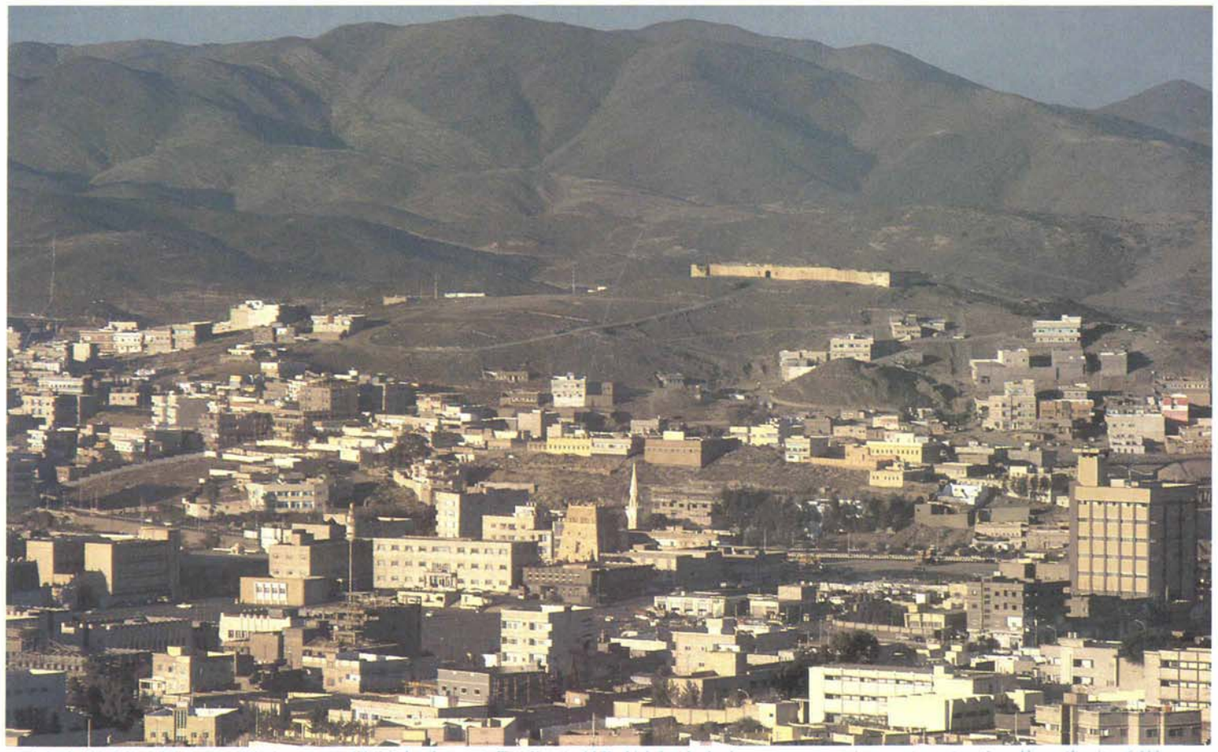
The key to this project, I gathered, was the excavation of some 10 million cubic yards of sea bottom and installation of 136 prefabricated caissons. Built in the kingdom, the caissons are to break the force of the waves and provide a tranquil 30-foot-deep harbor. On the verge of completion, the port eventually may have nearly two miles of docks and will be able to handle roll-on-roll-off traffic, as well as containers.

In beauty the Tihama cannot compare with the highlands. Indeed it struck me as a different country altogether: more Africa than Arabia. Flat and humid, the al-Darb plain is dotted with huts more characteristic of Africa than the Peninsula, and its shoreline with fishing boats from another coast. And at harvest time you can see a threshing ritual in which the farmers lay the stalks of durra on the ground and beat them with big, flat angled sticks, which they call *b'assa*, whirling the sticks in the air like majorettes.

But then, that's one of the attractions of 'Asir: the subtle and not-so-subtle differences that set it apart from the rest of the kingdom. These range from architecture – brick-and-stone "skyscrapers" built like forts but decorated like birthday cakes – to costume and attitude; 'Asir women frequently do not wear the veil, and their clothes, because of the cooler climate, are much closer cut. Many, furthermore, wear huge wide-brimmed straw hats, some of which could have graced the streets of Paris 80 years ago.

In the future, I expect, 'Asir will change swiftly as the kingdom's great road-building program proceeds and the provinces grow and flourish. Already, in fact, the population has increased – as workers pour in to assist in the agricultural expansion – and so has the number of visitors, many to see, even before it opens, the magnificent new national park (See next page). At last, its long isolation has come to an end.

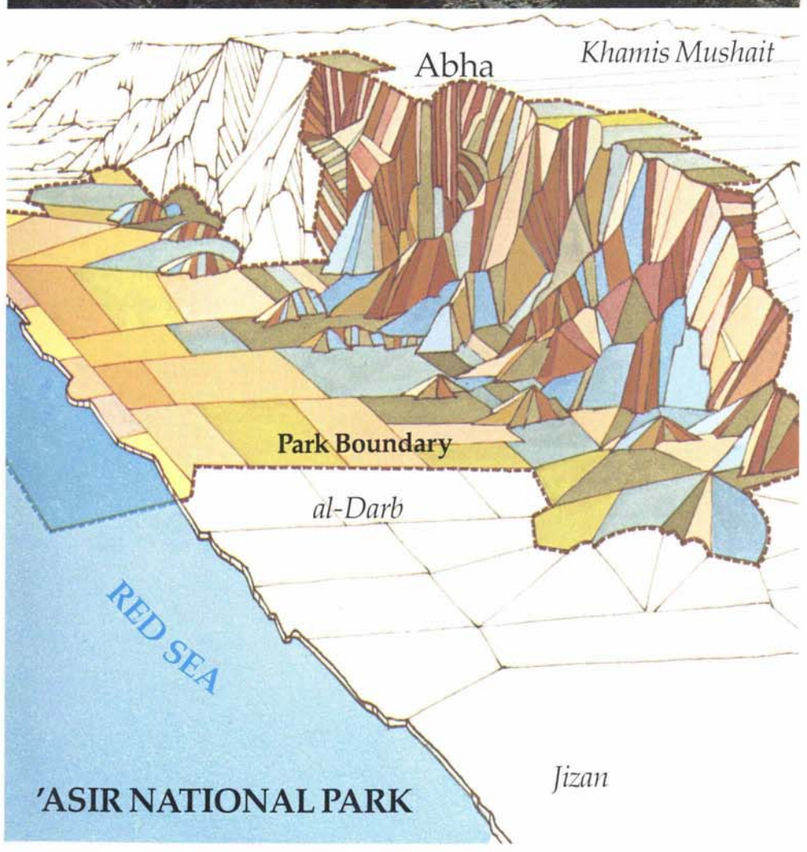
Tor Eigeland is an Aramco World *photographer and correspondent, and contributes regularly to European periodicals and to* National Geographic *books. Paul Lunde is an* Aramco World *staff writer.*



At left, the Wadi Jizan Dam, one of the keystones of 'Asir's development. Top, Jizan's old Turkish fort looks down at new container-port construction. Above, the city of Abha.

A Park for 'Asir

WRITTEN AND PHOTOGRAPHED BY AILEEN VINCENT-BARWOOD



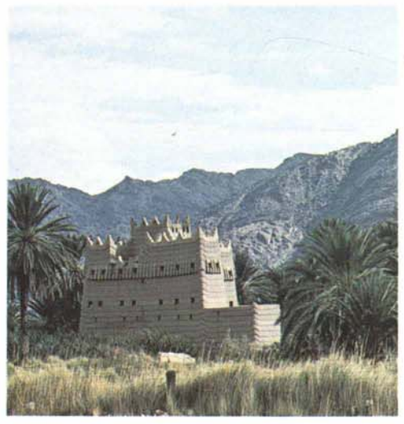
About now, in Saudi Arabia, the Ministry of Agriculture and Water is opening the kingdom's first national park: a $14-million, 1,000-square-mile natural preserve sweeping down from 'Asir's 9,000-foot peaks and the cool green amphitheater of Abha to the sun-baked plains of the Red Sea littoral with its incomparable coral reefs (See page 6) and splendid sand beaches.

When finished, U.S. park people say, the 'Asir National Park may rival the great national parks of the world in size and beauty — as well as in ecological importance and archeological interest. The deserts of the Empty Quarter aside, it is one of the last unspoiled wilderness areas in the kingdom.

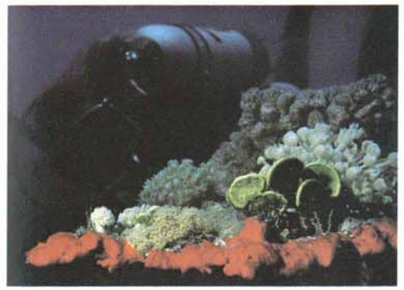
In the uplands, for example, after the winter and spring rains, you can see wild flowers carpeting the valley floor and apricot orchards filled with blossoms; higher still the park is a place where red foxes, hyraxes, wolves and baboons roam among the rocky hillsides — and where, it is thought, a few leopards still dwell. It is a place of hawks and kestrels, crows and ravens; the abode of over 300 species of birds: the gray hornbill, the Abyssinian masked weaver, the pygmy sunbird, the bee-eater, and a variety of Arabian songbirds. It is also one of the last refuges of the endangered vulture called the lammergeier.

There are forests here too — juniper forests stretching across the black flanks of Jabal al-Sudah like a monarch's cloak, rippling and sighing in the perpetual wind that blows up here, their sharp aromatic smell scenting the air, their dark green foliage shading the sun-dazzled land.

Under these trees, some of them 120 years old, men once raised their tents, gathered firewood, grazed their animals and hunted game. But then, with the introduction of trucks and modern firearms and with overgrazing by ever-larger herds, this changed. In a few short years, they began, unwittingly, to destroy their own environment. The wildlife declined, the trees were decimated, the grassy slopes were denuded and the soil eroded.

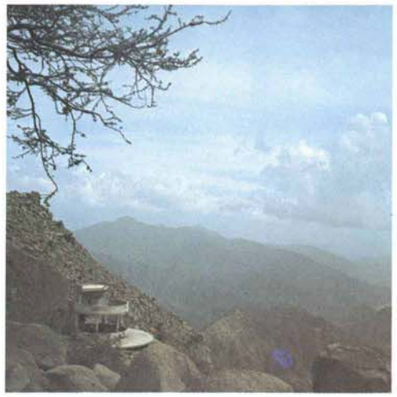


The park, fortunately, will reverse this trend. Though most of the park will remain a wilderness, park authorities have already created 225 family camping sites — with tables and grills and piped water — parking and toilet facilities, nature trails and lookouts, concession stands and information booths, play areas and hiking paths. One example is al-Dalaghan, an oasis of green surrounded by rocky outcroppings. It has ponds and running water and though blacktop roads wind throughout they take maximum advantage of the terrain; rocks and trees, for example, provide natural privacy for overnight camp sites.



Indeed, all the campsites, buildings and trails make the most of natural features. Parking areas and buildings use existing slopes and grades, nature paths use old trails, trees are preserved, boulders left in place, and all signs and maps, while clearly visible, are unobtrusive. The administration and visitors' center, for example, halfway between al-Qura'ah in the south and al-Sudah in the north, is perched like an eagle's eyrie on the edge of the escarpment. Part showcase and part museum, it has seven exhibit rooms which begin at the entrance lobby and ascend a ramp to the top level, unfolding en route a $1.5-million visual presentation of the park's habitats, and climaxing in an outlook over a vast panorama of majestic peaks marching away in ranks to the Red Sea, 45 miles away, and Wadi Dila, some 3,000 feet below.

From this eyrie, visitors can see, snaking down the side of the escarpment in a series of hair-raising switchbacks, the new road to the coast and, on a clear day, the sparkling waters of the Red Sea, where two other centers will be built: one at al-Shuqayq on the beach near Jizan, the other amid the date palms, fields of corn and thatched huts of the Tihama.



The park, essentially, was the idea of King Khalid, who ordered close supervision of hunting and the preservation of flora and fauna throughout the kingdom. Assisting were Prince Sultan ibn 'Abd al-'Aziz, who set up a commission to carry out the plan, Prince Khalid ibn Faisal ibn 'Abd al-'Aziz, Prince Faisal ibn Bandar ibn 'Abd al-'Aziz, the amir and deputy amir of 'Asir province, and 'Abd al-Karim al-Kuwaiti from the Ministry of Agriculture and Water.

The design of the park, part of a project set up by the U.S.—Saudi Arabian Joint Economic Commission, was provided by the Colorado-based firm of Wirth-Berger, whose on-site landscape architect Ken Magdziuk spent all of 1979 overseeing construction of facilities. The park is being managed, moreover, by eight U.S. National Park Service rangers and administrators, all dedicated to the motto of U.S. parks — "Take only pictures, leave only footprints" — and the park superintendent is Mohammad Khan, an amiable Pakistani-American and long-time National Park Service administrator.

These men, having launched and guided the project, were still, on the eve of its completion, keeping a close eye on its progress. Prince Khalid, for example, who heads the only provincial government with its own development department, intends to see that wise planning directs all future development. To this end, he has backed a committee formed to draw up a national parks policy.

Such a policy will be vital, because tourism from within the kingdom is definitely coming to 'Asir Province. Even now Saudis and expatriates are flocking to the cool highlands to escape the city heat, and Saudia, the national airline, is running four flights a day from Riyadh to Abha, and four from Jiddah. Some Saudi Arabs are building homes on Abha Lake; Prince Khalid is planning a holiday village adjacent to the park site on Jabal al-Sudah with tennis courts, swimming pools, a golf course and villas for rent; and two more hotels are scheduled. Without protection, the beauty of 'Asir could easily be spoiled, particularly when the park is officially open and visitors begin to arrive in large numbers.

That's not far off. Visitors have already begun to come. One family, for example, recently drove seven hours from Najran to camp for three days in the shade of some gnarled cedar trees, and another drove down from Abha just to spend the day. A portent of the future, they spread their rugs in the shade and made tea as the children, wide-eyed, stared entranced at the scene around them: a sea of mountain pinnacles, valleys blue with distance, a hawk plummeting down in pursuit of a crow and, in the clear air, kestrels hovering in the wind...

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As the birdmen say, 'One good tern disturbs another...'

ABOUT TERNS

Swooping, diving, skidding through the air, dodging, jinking and turning, the two birds tumbled through the Arabian sky in a spectacular display of excited high spirits. One held a small silver fish in its beak, the ostensible reason for this dazzling aerobatic performance. But as we watched, the pair alighted briefly on the beach, the silverling was ceremoniously transferred from one orange-yellow bill to the other – and the chase began all over again.

These were terns, also called sea swallows – slimmer and more graceful than their close relatives the gulls; and the aerial fireworks we were watching were the first display flight of this breeding season, performed above a coral island in the Arabian Gulf. More and more birds would join this first pair in the hours and days to come, as the excitement they generated crackled through the colony, until the sky was full of a tumbling mass of screeching gray-and-white birds with black caps.

WRITTEN BY RAYMOND J. CONNOR PHOTOGRAPHED BY BROCK STANALAND

Swift terns, with lemon-yellow bills and slate-gray plumage, and lesser crested terns, with orange bills and dove-gray upper parts, at their breeding colonies on Karan and Harqus Islands. Photographs on these pages show them landing, shading eggs with drooped wings, flying, guarding young chicks, lining the shore of Harqus Island and standing over their scrapes with wings spread.

Terns are found practically all over the world – though you are much less likely to see terns during a walk on the beach than gulls. Terns' longer, narrower wings and weaker, shorter legs make them truly creatures of the air: they perch but hardly ever walk, and they only even settle on the water for a few moments at a time to bathe. Only the compelling urge to breed forces them to the land; then these wanderers of the oceans select isolated islands, near good fishing grounds, for their breeding colonies in which hundreds or even thousands of pairs of terns mate, scrape out their minimal nests, brood and raise their chicks.

Warm and teeming with fish and shellfish, the Arabian Gulf is also dotted with uninhabited sandy islands topping some of its many coral reefs (See *Aramco World*, November-December 1978). So it is not surprising that Saudi Arabia plays host to thousands of breeding terns every May and June on six or more of the Gulf islands.

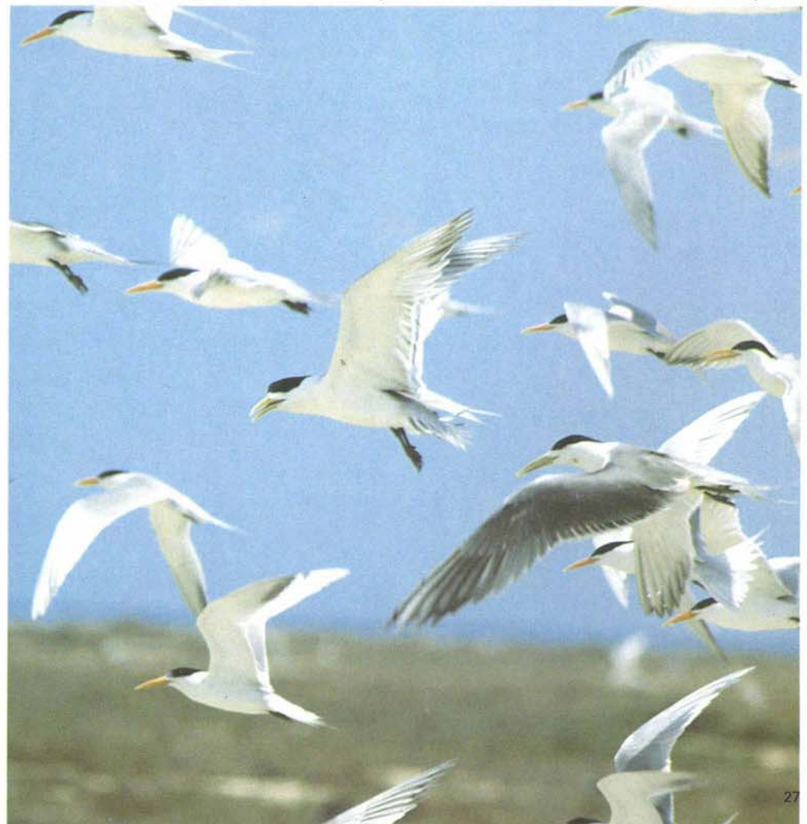
That terns nest and breed in the Gulf has been known to Westerners since at least 1878. In those days, ornithology was a science in its infancy, decorously pursued in their leisure time by gentlemen travelers and far-flung military officers; one of them, a Colonel E. A. Butler, obtained eggs of Caspian and gull-billed terns collected for him on an island off Kuwait and, three months later, added several hundred eggs of another tern species to his bag on al-'Arabiya and al-Farisiya Islands, off what is today Saudi Arabia. The eggs ended up in the British Museum; by the close of the century Colonel Butler, and others like him, had identified eight species of terns breeding on Gulf islands.

Last summer we located one of the most elusive: the swift tern (*Sterna bergii*), which had been known to breed off Iran and Kuwait but had only rarely been sighted – and never recorded as breeding – in Saudi Arabia's Eastern Province. On a trip to the islands of Karan and Harqus, we found and photographed sizeable colonies of these noisy 19-inch crested birds with their distinctive lemon-yellow bills.

We visited those islands, and others in the Gulf, for several reasons. For one thing, data on the distribution of terns are still a long way from complete: the birds are shy, they spend most of their time over water, they move around a great deal – either in migration or within their breeding and wintering areas – and they are notoriously fickle about where they breed, abandoning and re-establishing breeding grounds from year to year without any good reason that frustrated ornithologists, at least, can detect.

Beyond filling in some ornithological blanks, though, and beyond our own pleasure in watching and photographing the family life of these graceful birds, the presence of these thriving tern colonies is a measure of the level of pollution; we were very pleased at how many large and busy breeding colonies are still flourishing.

One was just being established when we first visited Karan Island in mid-May. We



found many bridled terns that wheeled around us or perched uneasily in the salt bushes, looking as if we had interrupted something important. We had; the birds were establishing their nesting territories by the old method of claim, counter-claim, threat and quarrel; later on each pair would nest in the middle of its little space, which would be just as big as one brooding tern could defend with pecks and lunges without getting off the eggs. Right under the straggly vegetation we found some of the first "scrapes" of these bridled terns.

Terns don't build elaborate nests. Soon after they arrive at the breeding grounds, both males and females start building the scrapes: the bird presses its breast to the ground while its long wings and forked tail are held vertically upward out of the way. Then it scratches with its toes, pushing the soil out behind it, and sometimes rotating as it scratches to produce a shallow, round depression in the sand or silt. Sometimes both birds of a pair work on the same scrape, which on compacted coral sand is often hardly visible at all; sometimes a pair makes a number of scrapes and then selects one of them to lay the eggs in.

Later that day we moved to the south end of Karan's mile-and-a-quarter length to photograph a colony of what we thought were lesser crested terns that had already laid their eggs. As we drew nearer, we saw that we had made a mistake: these birds had yellow bills, not orange ones; they were white and slate gray, not dove gray; and they were bigger than the 14-inch lesser crested terns that had nested on Karan Island in past years.

The birds had their eggs on their minds and paid little attention to us. Their scrapes were unprotected by shrubbery, and the terns simply stood over them with the "elbows" of their wings drooped to the ground, shading the eggs from the baking heat of the Arabian sun. We photographed from closer and closer until finally the whole colony flew up at the same instant in an explosion of wings and calls. They revealed to us about 400 eggs on the dry coral sand – some of the most incredibly varied eggs we had ever seen.

The background color was either pinkish buff or yellow-gray or bluish white – and in one case bright blue! – and there were blotches and scribblings of reddish brown, umber and black superimposed on lilac shell markings. This wide color variation is characteristic of swift tern eggs and confirmed our identification of a species that no one had ever before recorded as breeding in the Eastern Province.

Both that colony – and another we found the same day on Harqus Island – had a difficult breeding season, though. The 50-egg colony on Harqus had already been wrecked once when we first saw it; waves had swept over the breeding area and left the eggs wet, sand-covered and dented – and already beginning to smell. On another visit on May 25, we found the terns had laid new eggs in scrapes further from the shoreline; terns normally replace lost eggs if they've been recently laid and it's not too late in the breeding season. But when we returned to Harqus the last time, early in July, a severe storm in the Gulf had brought heavy seas that had clearly swept right over the island, carrying everything with them. The only remaining sign of life was a disconsolate line of lesser crested terns standing on the beach; there were no nests and no eggs. The swift terns had moved to the greater security of Karan Island.

Karan's original swift tern colony had had its own share of tragedy. When we revisited it on May 25, the sand was littered with broken eggshell; not one whole egg remained of the 400 we had seen earlier and black Socotra cormorants stood sentinel on the sandspit. Probably, the cormorants were not guilty of destroying the colony – they are mainly fish-eaters – and the eggs had been broken and eaten by the versatile, predatory ghost crabs common on the islands. Baby turtles and other crabs make up part of their diet, so surely they are capable of making a meal of terns' eggs.

Elsewhere on Karan Island, though, a colony of several thousand bridled terns was doing better – perhaps because they seemed to prefer making their scrapes on the higher ridges, away from the beach-roaming crabs and deep in the protection of the thickest of the salt bushes. Not far from

At left, an exhausted lesser crested tern chick, just hatched from the egg. Right, a two-day-old lesser crested tern chick ready to be fed. Below, a white-cheeked tern chick of about the same age. Below left, an adult bridled tern in flight.

them was a colony of a few hundred white-cheeked terns, one of the species in which both the male and the female of the pair sit on the eggs, tern and tern about. Most of their nests, unshaded, contained two eggs, which we noticed frequently had small drops of water on them. Apparently the bird that relieves its mate on the nest returns from the sea with a little water trapped in its breast feathers; the water is transferred to the eggs and – "intentionally" or not – helps keep the eggs cool and the embryo inside from drying and dying in the heat.

On the bare plateau above Karan Island's steeply sloping west beach, two colonies of lesser crested terns, each about 1,000 pairs strong, had laid their single eggs on the sand. The compact masses of the tern colonies help protect the birds from predators like falcons, who can't easily single out one target from a whirling mass of identical birds – and who are also intimidated, as we were, by the terns' swooping, diving mob-aggression tactics when they're alarmed. For, make no mistake, terns may come together in large groups to breed, but their loners' instincts are only barely suppressed during that time. In the colonies, very clearly, one good tern disturbs another, and occupants of adjoining territories are constantly testing the "stabbing distance" between them with pecks and beak-fencing.

This is especially true when both terns of a pair are at the nest at the same time, provoking spreading ripples of dissension and irritation in the colony – and providing a better target as well. We even found the fresh corpse of an adult tern, killed by a blow from the beak of one of its neighbors.

Similarly conflicting instincts even cause tensions between mates. During the approximately three weeks that lesser crested and swift terns sit on their eggs, the bird on the nest is fed by its mate, usually with small fish presented in an atmosphere of much excitement. Necks are stretched and bills are held vertically as the sitting bird tries to reach the fish without getting off the eggs and its mate seems torn between its own appetite and its instinct to feed its partner. After a little fencing and lunging, though, the fish is given to the sitting bird – or, more frequently, simply snatched.

Despite tension and conflict, though, the colonies grow in size because they do provide relative security to the birds in them, and the two 1,000-pair lesser crested tern colonies on Karan Island grew, in only about a week, to an enormous quarreling carpet of birds: 15,000 to 20,000 pairs, with some 1,000 additional pairs of swift terns – mostly refugees from the colonies destroyed earlier – in their own adjoining group. It was an impressive sight, and we set up a blind from which to photograph it.

As we did, I saw two fishermen in the distance collecting tern eggs, and I set out to

TERNS OF THE GULF

Terns belong to the order Charadriiformes, which includes shorebirds, gulls and auks — all strong-flying birds of open country or open water that, with a few exceptions, nest on the ground. The suborder Lari includes 92 species of long-winged, web-footed birds: gulls, terns, skimmers, skuas and jaegers. They range from the great black-backed gull that weighs in at four pounds and has a wingspan of five and a half feet, down to the least tern, which carries its one-and-a-half-ounce weight on a 20-inch wingspan.

The world's most migratory bird is the arctic tern, which flies from Antarctica to its Arctic breeding grounds and back each year — a straight-line distance of over 22,000 miles. A fashion for tern feathers in ladies' hats in the U.S. late in the last century led to the near-extinction of several species of terns in North America and to one of the newly-founded Audubon Society's first public campaigns. Hawaiian fishermen are said to use flocks of noddy terns as guides to the location and depth of tuna schools. And in many parts of the world, tern eggs are regularly harvested.

Nine species are known to breed in the Gulf, one of few regions that size in the world — and perhaps the only one — that can claim so many.

The gull-billed tern (Gelochelidon nilotica) *has a stout, relatively short all-black bill. It is about 15 inches long and in its behavior is the least typical of all the terns of the Gulf. It rarely, if ever, dives for fish tern-style; it is often found on mud flats and salt marshes, where it feeds on small crustaceans and mollusks. It frequently hawks for insects, catching them on the wing like a swallow. Formerly, it nested in large numbers on islands off the coast of Kuwait and it is still a common resident on the Iranian coast. It occurs on the western shores of the Gulf as a passage migrant and winter visitor.*

The most striking feature of the Caspian tern (Hydroprogne tschegrava) *is its heavy bill of bright blood-red. It is the largest of all terns, about 21 inches long, and predatory, regularly harassing smaller birds until they give up their catch. It flies less buoyantly than other terns and is the only one that regularly settles on the sea to swim. It breeds at the north of the Gulf and perhaps on islands off the coast of Kuwait, and,*

recent reports say, on islands off the United Arab Emirates as well.

The swift tern (Sterna bergii), *in the foreground, above, is almost as large as the Caspian tern, but its beak is slender and all lemon-yellow in color. Its flight is far more graceful. It breeds off the coasts of Iran and Kuwait and, we have now discovered, Saudi Arabia's Eastern Province.*

In many respects, the lesser crested tern (Sterna bengalensis) *is a smaller version of the swift tern. It has a bill of rich orange-yellow, lighter gray plumage and, at 14 inches in length, is appreciably smaller. It is widely distributed as a breeding species throughout the Gulf, but there are no records from Bahrain. Off the Eastern Province it breeds regularly in large colonies on the islands of Jurayd, Jana, Kurayn and Karan, and last year bred — unsuccessfully — on Harqus. In the past, this species has nested on al-'Arabiya and al-Farisiya Islands, but we don't know whether it still does so.*

The common tern (Sterna hirundo) *is one of a number of very similar smaller terns. It is only about 14 inches long, and much of that length is in the streamers of its deeply forked tail. Its vermilion bill, which normally has a very dark tip, is a good aid for identification. Breeding has only been established in the north of the Gulf, on the Iranian coast and on Kubbar Island off Kuwait. Elsewhere, it occurs as a winter visitor or passage migrant.*

The white-cheeked tern (Sterna repressa), *at right, is a little smaller than the common tern and its plumage is a much darker gray both above and below, which makes its white cheeks very conspicuous. Its bill is dark for most of its length, shading to red at the root. White-cheeked terns occur throughout the Gulf and are probably the most widely distributed tern, breeding in colonies of varying size not only on islands but also, where undisturbed, on sandspits and mainland beaches. They breed regularly on Jana, Jurayd and Karan Islands.*

Both the little tern (Sterna albifrons) *and a very similar species, Saunders' little tern* (Sterna saundersi), *also occur in the Gulf. They are only 9½ inches long with deeply forked tails and black-tipped lemon-yellow bills. The features that distinguish the two species from each other are the subject of much argument even among experts. Saunders' little tern breeds regularly in small numbers in Bahrain and commonly along the Gulf's eastern shores; in the northwest of the Gulf the little tern predominates. Both species are spotted as summer visitors or on passage through the Eastern Province, and in recent years there have been reports of one of the two species breeding near freshwater pools in the area of Hofuf, in the al-Hasa Oasis.*

The bridled tern (Sterna anaethetus), *opposite page, is the only tern likely to be seen in the Gulf that has all-dark upper parts except for the white bridle at the back of its neck. It too is about 14 inches long, has a black bill, and has a black stripe through its eye that accentuates the white forehead. It is widely distributed through the Gulf and prefers islands with a fairly dense vegetation that can provide nesting cover, though it sometimes breeds in cavities on rocky slopes. It nests on Jurayd, Jana, Karan and Kurayn Islands.*

reach the swift tern colony at the same time they did. Each man had a 30-inch metal bowl piled high with eggs; when they had filled them full, they hoisted the bowls onto their heads and set off across the island back to their dhows. I walked the stretch of beach they had harvested; in two densely populated sections of the colony of lesser crested terns, every egg but one had been taken.

Birdwatchers – and conservationists generally – find it easy to get emotional about an event like this, but there is room and reason for second thoughts. The fishermen, quite correctly, regard the tern eggs as a gift from a bountiful God, and have harvested them as long as there have been terns – or men. And the terns, for their part, readily replace the eggs in about 10 days, so – barring repeated harvesting of the same parts of the colony – there is no harm done to the terns either individually or as a species. The real danger lies in more intense commercial exploitation: that would deplete the stock of birds even more rapidly than it seems to have depleted the stocks of Gulf shrimp in recent years.

The eggs that were left – and of course there were thousands – began to hatch in mid-June, and hatching went on for weeks. In early July we still found terns sitting on unhatched eggs; many of them were already pipped by the chick's struggles to get out, with the hard, temporary "egg tooth" on the end of the hatchling's bill showing in the hole. The effort of pecking and fighting its way out of the shell takes the chick to the very end of its strength, and it spends its first few hours after hatching in a wet-looking, bedraggled heap at the bottom of the scrape. Once the membranes covering the individual downy feathers have been rubbed off, the chicks show the markings of their species on their down: mottled pale silver-gray for the swift terns, grayish white with black spots and streaks for the lesser crested terns, and sandy fawn with black markings for the white-cheeked terns.

There in the scrape, lesser crested and swift tern chicks spend their first three or

A group of swift terns stands disconsolately on the beach at Karan Island after their eggs have been destroyed. Larger birds in the background are Socotra cormorants.

four days, fed on bits of fish regurgitated by their parents, who defend them furiously and fearlessly. Yet those are the young birds' most critical days, for if the adult birds are forced away from the nest – by curious humans, for example – the chicks may wander into a neighboring nesting territory. We watched an unlucky bridled tern chick wander from its scrape under a salt bush into the nesting area of a small group of swift terns. Bowled over by a savage lunge from a pointed lemon-yellow beak, it picked itself up only to be struck again and again as it blundered from one nesting territory to another. Eventually, squealing with fright, weakened and confused, it was carried off by an adult swift tern and dropped, limp, into the undergrowth.

Things are not so brutal once the chicks are older than a few days. Swift tern chicks all hatch at about the same time, and territorial defenses are abandoned by the adults when the hatchlings – still in down – are ready to leave the nest. Their parents lead them to scattered patches of protective cover on the edge of the colony. Even so, some of the chicks get separated from their parents during the trek – but by some sudden genetic miracle the adult swift terns are now no longer viciously aggressive toward strange chicks, but actually protective. Though, on Karan Island, only a tiny percentage of the swift terns had hatched two eggs, we now found many terns brooding two or even three chicks: their own as well as a temporary "foster child."

Lesser crested tern chicks of the same age are herded together in large "nurseries," where relatively few adult birds babysit while the parents go fishing. Yet on their return the adult terns can identify their own chicks among thousands of identical balls of fluff, and only rarely succumb to the pleading gape of another hungry beak. The nursery on Karan Island must have contained at least 10,000 chicks, all hungry – a scene of considerable confusion.

Any close approach to the nursery causes deaths among the chicks, which panic, run into the sea and – though they can swim – soon become waterlogged and drown. The adult babysitter terns on Karan spotted us at a distance and attacked with utter determination, flying directly at our faces. It would take a determined intruder to come any closer, and we did not.

Man's less direct approaches, however, could pose a serious threat to the tern. Although rats, mice, crabs, airborne predators, and the tank-like turtles – which can crush eggs and chicks as they plow ashore to lay their own eggs – also pose threats these are all forces as natural as heavy seas, and the terns have successfully coped with them since they evolved. What they can't cope with is the destruction of their breeding grounds, or of the isolated and undisturbed character of the breeding grounds. Thus oil spills and visitors are what could do the terns in.

So far, the Arabian Gulf has been spared all but the most local pollution; indeed, the terns' continued presence in the Gulf testifies to the current low level of pollution. But controls on visitors to the breeding islands may still have to come – if only for the annual two to three months of the breeding season – since casual visitors, all unaware, can harm eggs or chicks or keep adult birds away from their nests. If it keeps these beautiful birds in the Gulf, that modest additional protection will have reaped a rich return.

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