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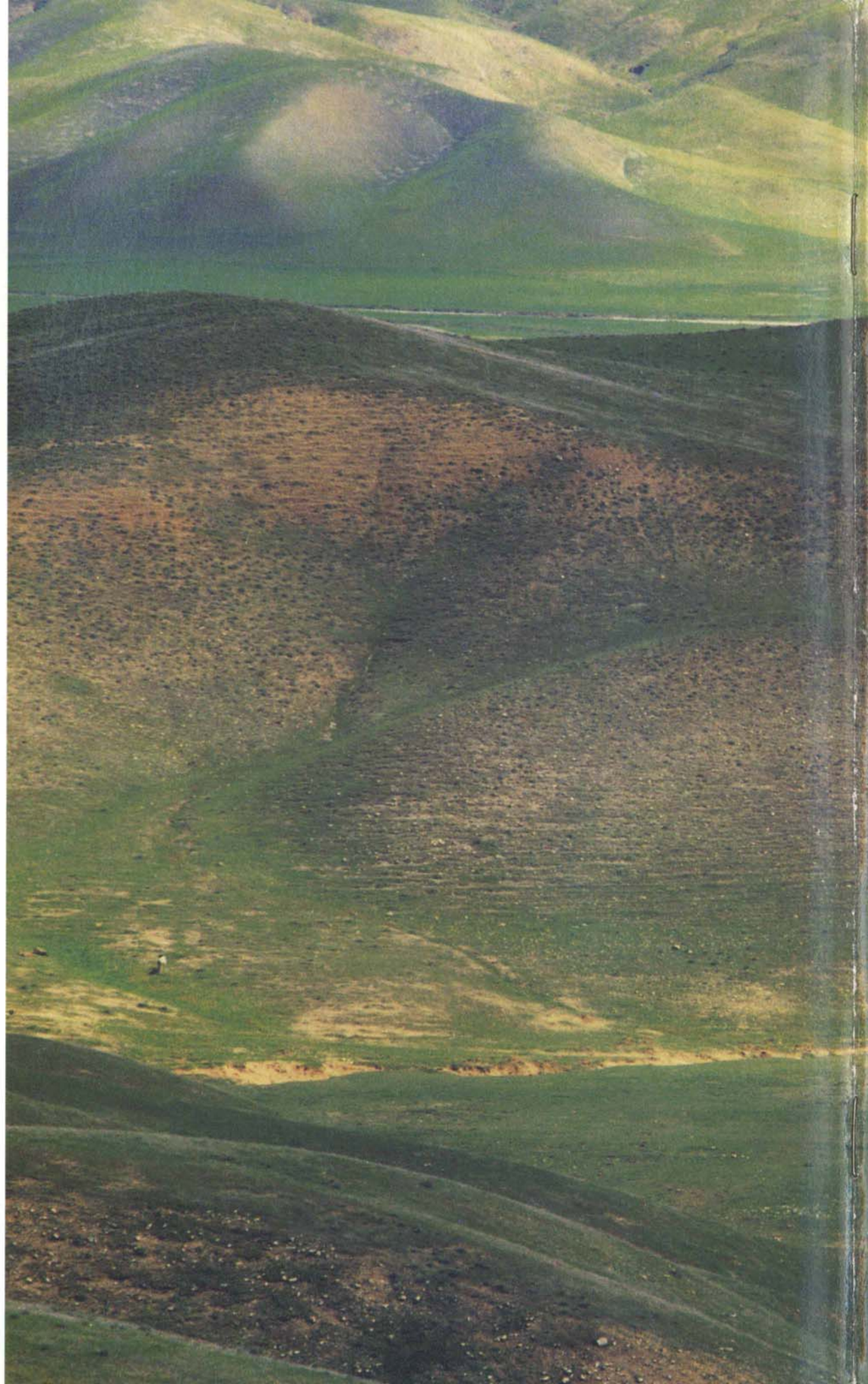

IMAGES *of* AFGHANISTAN

KLEE, HAMMAMET WITH ITS MOSQUE
METROPOLITAN MUSEUM OF ART, BERGGRUEN KLEE COLLECTION 1984

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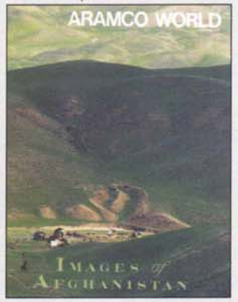

Cover: Yurts like these in Samangan Province, Afghanistan, are the portable homes of many of the pastoralists of Central Asia. Reed mats and heavy felts are tied onto a circular wooden-lattice framework. Most of the traditional, standard shapes for carpets woven by the tribes in these areas are designed for use in specific locations within the yurt – the *ensi* is an outer cover for the doorway, for example. There are also specific names and sizes for the bags that hang from the interior frame of the yurt to hold clothing and belongings. Photo: Luke Powell, with Pentax 6x7 and 105mm Takumar, on Vericolor.

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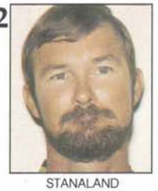
PETERSON


TABOROFF


POWELL


PLEDGE


SPAKE


STANALAND

A PASSION FOR COLOR

WRITTEN BY JANE PETERSON
PHOTOGRAPHED BY GAYLE GARRETT AND HARALD BÖHMER

Detail of a DOBAG carpet, left. The rediscovered natural dyes produce richer, softer colors that some feel are superior to synthetic dyes. Chemist Harald Böhmer, right, helped revive the organic dyes.

In 35 wind-scoured villages of northwestern Turkey, long-forgotten secrets of the dyer's art have been rediscovered. Natural dyes made from local plants are being used to create colors not seen for more than a century. And the resurrection of this ancient art has inspired rug-weavers to reach back to the finer craftsmanship – and the different way of seeing – of their grandmothers, in the days before chemical dyes. The results are not only new carpets that recall the rich color harmonies of the treasured nomad and peasant rugs of the past, but also changes in the patterns of village life.

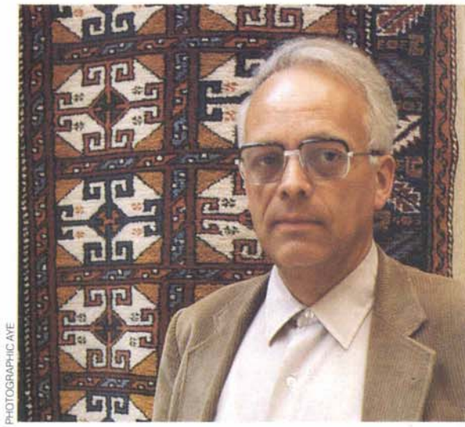
The weavers, organized into a cooperative under Turkish law, have refused to accept for marketing rugs colored with chemical dyes – even though insisting on natural colors only makes their work more difficult, since the plant products are less easy to control than industrially-produced chemical dyes. At the same time, the special qualities of naturally dyed wool are not apparent to everyone, for color exists – quite literally – in the eye of the beholder. Where natural-dye enthusiasts see "mellow" hues that sparkle and glow, others see nothing special – at least, nothing worth the effort of looking at a carpet long enough to be drawn into it. To do this one needs, perhaps, a passion for color.

Ironically, over 100 years ago, it was a passion for color – specifically, the bright colors and seductive patterns of so-called "Turkey carpets" – that contributed to the disappearance in Anatolia of the natural dyes being revived today. Inspired by a series of international expositions between 1851 and 1876, Europe's new industrial middle class lined its sitting-rooms with hand-knotted Turkish carpets. The increased demand outstripped supply, and rug prices increased. But higher prices could neither speed up the laborious hand-work needed to collect raw materials for natural dyes, nor increase the supply of those dyeplants that were not cultivated crops.

An 18-year-old English chemistry student came to the rescue. William Perkins, working over his Easter holiday from the Royal College of Chemistry in 1856, was completing an assignment from his German professor, Wilhelm von Hoffmann, to attempt to synthesize quinine. Accidentally, he produced a purple substance that, he noted, dyed silk as well as cotton with a color that was both bright and lightfast. Perkins instantly abandoned quinine and applied for a patent for his synthetic dye, which he called mauveine after the purple flower of the mallow, *Malva sylvestris*. Von Hoffmann, later returning to his own country, triggered a virtual gold rush in German universities to analyze natural dyes and synthesize them, and Germany's synthetic-dye industry soon outstripped the English one that Perkins had founded.

More than 2000 synthetic dyes were patented in Germany alone in the next half-century. Because these so-called aniline dyes were cheaper than traditional natural dyes, could be produced in any quantity, and were easier and less time-consuming to use than traditional dyes, they soon invaded Turkey's carpet-weaving cottage industry.

At first, there was a backlash against synthetic dyes because some tended to run and fade when washed. However, as better anilines were produced, and European experts were brought in to supervise the new process, more dealers and weavers switched to chemicals, and by the 1880's the majority of the big manufacturing networks were using synthetic dyes, even though they did not provide the range, subtlety or harmony of color that natural dyes, used by skilled and patient hands, could produce.



PHOTOGRAPHIC AYE

While the bright colors delighted some clients, they seemed harsh to others, so merchants set about "synthesizing" the mellow look of the old carpets, too, exposing the new rugs to the elements, burying them in dung heaps or immersing them in bleach or alkali baths. Such ploys satisfied the new middle-class market, but not the more discerning clients – including the Ottoman court – who continued until about 1900 to demand naturally dyed carpets. Nomad and peasant weavers, who wove not for dealers but for their families or in order to make a pious gift to a mosque, also clung to their traditional methods, relinquishing them only on the eve of World War I.

It was in the Great War that the Turkish rug-making industry overall went into a decline from which it never completely recovered. The final blow came in the 1960's, when a new mechanized rug industry took over the small market for hand-knotted rugs, and village weavers were urged to imitate the look of machine-made carpets. Played off against one another by dealers who bid their prices down, and squeezed by inflation, the weavers could not afford to buy good wool or to spend time tying many knots. By the late 1970's, their rugs were of very poor quality indeed.

The catalyst that was to change this situation, at least for some villagers in northwestern Turkey, was Dr. Harald Böhmer, a German chemist who arrived in Istanbul from Daimehof, near Bremen, to teach chemistry, physics and biology in the German school. He and his wife, Renate, became fascinated with Turkey in general and with old Turkish carpets in particular. Böhmer is "crazy for yellow," he says – not just any yellow, but a certain mustard shade found in old Turkish carpets – and whenever possible the couple has bought rugs with the particular shade of yellow he likes.

The Böhmers were struck by the difference between the colors in museum carpets and those they found in Istanbul's bazaar, and they were frustrated by their inability to explain it. Then, in 1976, Böhmer learned of a new laboratory technique called thin-layer chromatography (TCL), a method devised by chemist Helmut Schweppe to analyze irreplaceable textiles without consuming more than a few precious grams of the fabric.

TCL relies on the fact that different chemical substances, in solution, migrate different distances across a coated glass plate because of their differing degrees of attachment to the coating material. Once separated, the components of the unknown substance – such as a dye – can be identified by the distance they have moved, and by staining them with chemicals. Using this technique in a laboratory improvised in his kitchen, Böhmer began analyzing the dyes in old rugs in his free time, comparing them with pure, known dyes and possible dyeplant sources. The impurities present in the natural dyes facilitated matching them with dyeplants indigenous to Turkey. Over 10 years, the chemist analyzed more than 300 carpets and flatweaves and some 50 plants.

Then, studying dyes from plants that grow only in certain limited areas – buckthorn (*Rhamnus petiolaris*), for example, which grows in a region of central Turkey – Böhmer made it possible for the first time to trace the geographic origin of some carpets by identifying the source of their colors. With a fellow teacher and rug lover, Werner Bruggemann, he began working on a book entitled *Rugs of the Peasants and Nomads of Anatolia*.

Looking at carpets in the villages of Anatolia, the Böhmers found no trace of the violet and golden yellow popular in nomad carpets a century before, or the soft reds and blues for which Anatolian rugs were famous. Instead, they saw handmade carpets in screaming yellows, vibrating oranges and tooth-grating greens. "It's a pity," they agreed, "all the trouble these women take in making these rugs, and they can't sell them."

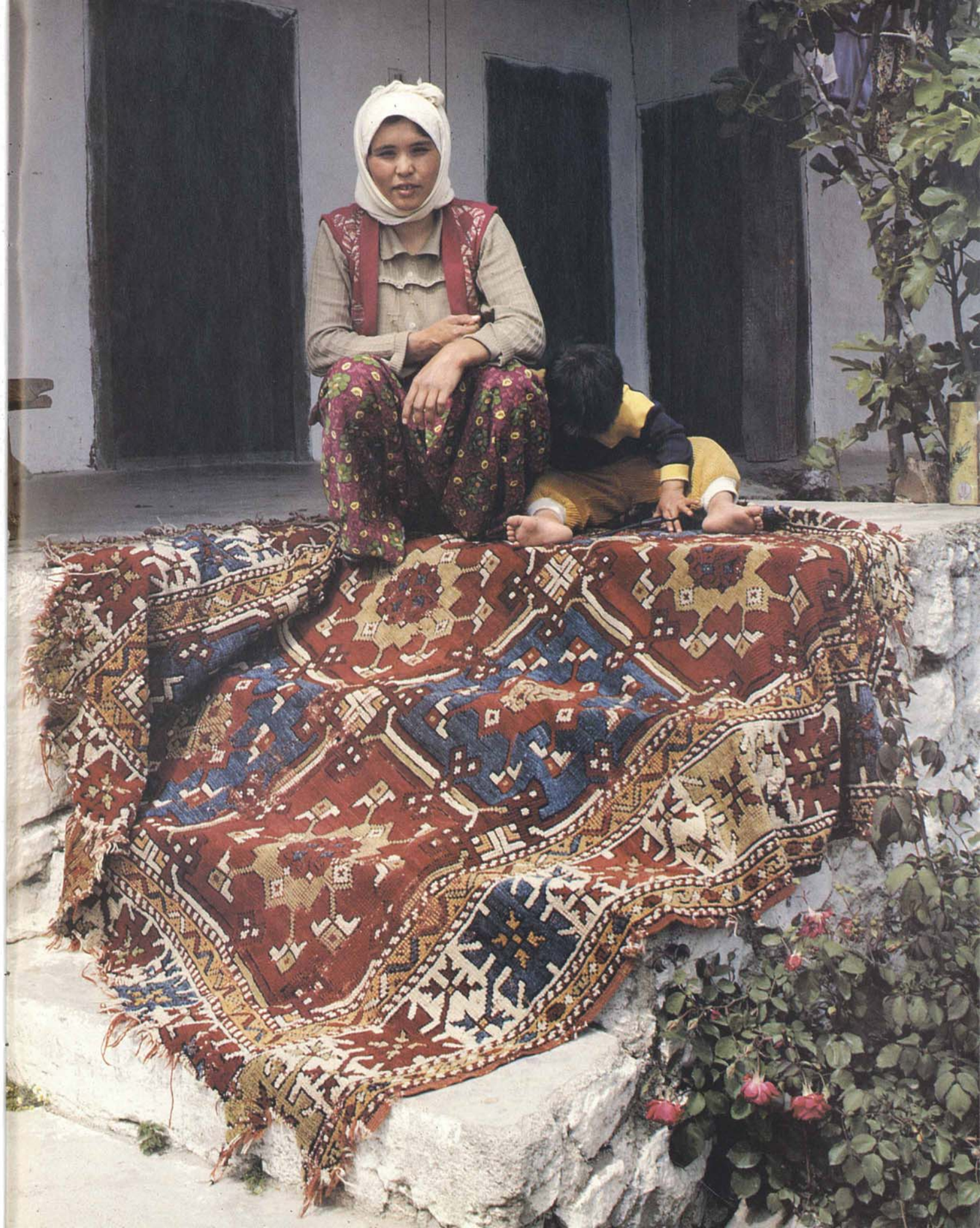
There are excellent synthetic dyes available today, remarks Renate Böhmer, but the villagers tend to buy cheap, poor-quality ones. And there is another problem with anilines as well. To turn greenish yellow into a softer golden shade, she explains, a tiny amount of red is needed, but "if it is half a milligram over, it is too much. You need really good apparatus to measure milligrams, and those things they don't have in villages. . . . With natural dyestuffs it doesn't matter, 10 grams more or less." Because natural dyes, unlike synthetics, contain "impurities," or tiny amounts of other colors, she adds, it is difficult to make a bad color combination with them, but with synthetics "you can make terrible things."

In 1978, Böhmer came up with what seemed like a natural idea: to help revive Turkish village weaving by reestablishing the use of organic dyes and, at the same time, reviving high standards of quality for handmade rugs. In view of renewed interest in Europe and the United States in natural products and handicrafts, he reasoned, such rugs might well find an export market.

Though the plant sources of certain colors were pinned down, the Böhmers still faced the problem of reconstructing the dyers' recipes. Scant literature existed. And when they visited the countryside, while they found a few old people who faintly recalled going out as children to collect plants for dyeing, none of them remembered how to extract color from the plants they had collected. So the Böhmers set about reinventing the craft, trying to figure out recipes and techniques that suited conditions in primitive villages. By 1981 they had a full range of recipes for basic colors – except one. Violet still eluded them.

Meanwhile, Böhmer was able to find support for his dyeing-weaving project, first in the German Ministry for Technical Cooperation and then in Istanbul's School

Dyestuffs, above, from top: Walloon oak acorn cups, whole madder root, oak galls, daisies. An old mosque carpet, right, is a design reference.



of Fine Arts – now the Faculty of Fine Arts of Marmara University, directed by Dr. Mustafa Aslıer. The parties agreed that the chemist would teach three days a week, and serve as adviser to the formally named Natural Dye Research and Development Project (Doğal Boya Araştırma ve Geliştirme Projesi, or DOBAG), the other three. In 1988, the university took over full responsibility for the project.

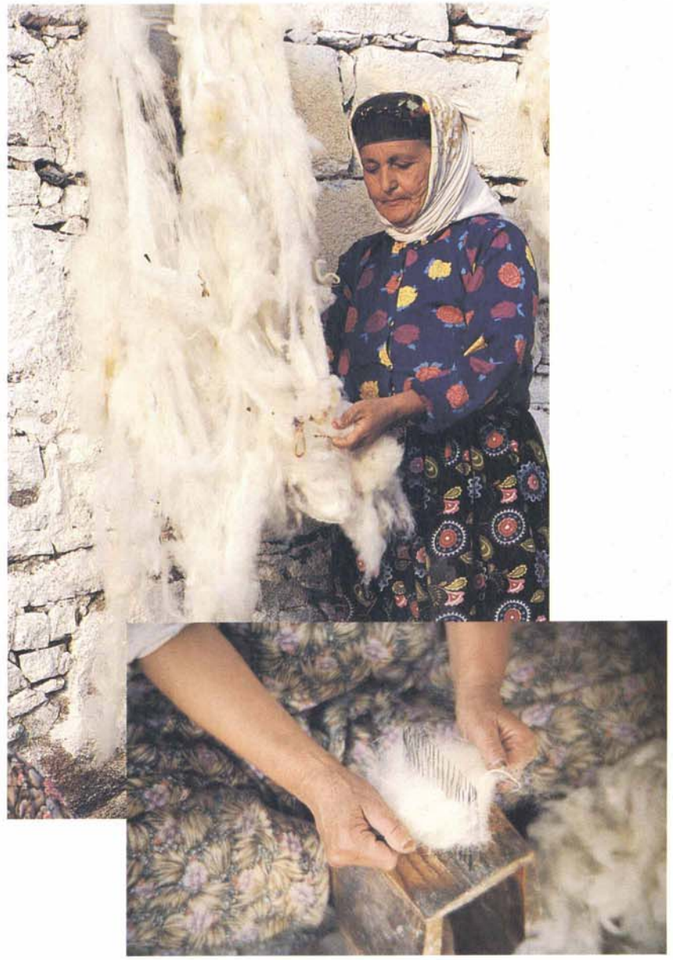
The poor district of Ayvacık in Çanakkale province was chosen to try out the idea. While some of its villages had been settled in the latter part of the 19th century by Turks from the Balkans, others had been more recently settled by nomads with deep-rooted dyeing and weaving traditions, but whose rugs had deteriorated so badly in recent decades that they had lost their markets.

Carrying leaflets with simple instructions, the Böhmers drove out into 10 villages in Ayvacık in the summer of 1981, and Renate Böhmer demonstrated dyeing methods to all the women, using the ubiquitous tulip-shaped Turkish tea glass as a measure. A small carpet was woven soon thereafter and successfully test-marketed in Istanbul, and by the end of the year 20 families had made 20 carpets.

To the south of Ayvacık near Manisa an even poorer district, Yuntdağ, asked to join DOBAG early in 1982, and this time the Böhmers tried a different approach. In order to maintain control over the process, they taught only a few people in each village how to dye. A young Turkish student of nomadic extraction, Şerife Atlıhan, who has since earned her doctorate, was hired to assist the villagers with the technical problems presented by handmade looms. Her other, more difficult, assignment was to reject rugs that did not measure up to the cooperative's standards.

And DOBAG's standards were high indeed. The cooperative would buy only rugs made with long-staple winter wool and using the traditional rug designs of the village. And, of course, only natural dyes were allowed, with the exception of indigo sulfonic acid, which is chemically identical to natural indigo. Fine knotting, which serves both to articulate designs more clearly and to enrich color, was encouraged by the device of paying by the knot, and soon women who used to make 40,000 knots in a 1.5-square-meter (16-square-foot) rug began to make 100,000 knots instead.

It takes 10 sheep to produce enough wool for a 1.5-square-meter carpet. The thicker, longer winter wool is better not only because of its length and strength, but also because it "takes the dye" more evenly than the poorer-quality summer wool. Factors such as grease content are also important: If too much lanolin is left in the wool it will repel the dye in places, resulting in a mottled effect, yet a small amount of it makes spinning easier and deepens the colors.



Before DOBAG, weavers used to sell their good winter wool in the bazaar and buy summer wool to save money – and time. Ridding winter wool of burrs, and pounding and washing it to remove the dirt and most of the lanolin, is hard work, especially because villagers depend on wells and cisterns rather than streams for water. After washing, the wool is dried on lines and carded. In the past this was done by hand; now, more often, weavers use the machine the coop owns in Ayvacık.

The wool is prepared outdoors, often by older women who were sidelined from weaving in their early 50's because of arthritis. Gnarled and calloused, the hands that for decades have sown and weeded and harvested crops, then knotted perhaps 150 rugs in a lifetime, now take over the cleaning, the spinning, some of the dyeing, and the warping of the looms.

Women as old as 90 do the hand-spinning, some with drop spindles and others with spinning wheels. Hand-spinning is still considered superior to machine spinning for carpet wool because it produces a relatively loose yarn that both exposes more surface to the dye and knots properly.

Since most natural dyes do not adhere directly to wool by themselves, the yarn is first wetted and immersed in a bath containing a mordant (from the Latin *mordere*, to bite), which forms a kind of bridge between the fiber and the dye. Microscopic flakes attach themselves to the fibers much as rust does, and it is these flakes

Villager cleans debris from washed wool, upper left. Hand-carding, lower left. Plying yarn, above. Dyer lifts yarn skein from pot, below. Right: skeins of madder (red), oak (dark blue), indigo plus daisy (green), daisy (yellow), indigo (light blue).

that the dye molecules will penetrate, becoming lightfast and insoluble.

The type of mordant used to bond the dye to the fiber affects the outcome significantly. If alum is used for madder red, for example, a brilliant hue results, whereas an iron mordant will, as some dyers say, "sadden" the color, producing a duller, russet red. Small amounts of copper are also added to the dye bath to increase the lightfastness of the color.

Madder (*Rubia tinctorium*), once the most important dyeplant in Turkey and the world, produces a bright red dye if its roots are coarsely ground and soaked overnight, then steeped briefly at around 65 degrees centigrade (150°F). It also yields the so-called "second red," which is the color of cantaloupe flesh. For the first red, the wet, mordanted yarn is gently "cooked" below a simmer till the dyer sees the color she wants; then it is carefully rinsed in water containing oak ash – whose alkalinity brightens the color – and dried.

Serendipitously, madder plants grow wild in cotton fields today, stray descendants of an earlier cultivated crop, and farmers are delighted to have DOBAG villagers weed their cotton for them and cart off 10 tons of madder each summer. Dyer's weld (*Reseda luteola*), which makes yellow, is now being raised in some village gardens, and if the cooperative's success increases, madder may have to be cultivated once again as well.

It was only in 1983 that madder finally yielded up the secret of a lovely amethyst shade that Böhmer calls violet, another of his favorite colors found only in old nomad and village weaving. "He likes mostly the difficult ones," comments Josephine Powell, a friend of the Böhmers and DOBAG both. An ethnographer and former social worker from New York City who bounces around Turkey in an old van to study nomad and village life, it was Powell who rediscovered how to make this color, which hadn't been seen since the late 1800's.

"She started to experiment a little with her dye pots," says Böhmer, "and she found the right way. I always thought it should be more complicated, but she had the idea that it must be simple because it had been done by nomad weavers up to the late 19th century." Now the secret of madder violet is guarded by DOBAG much as the master dyers of an earlier age protected their recipes, in order to keep competitors from using them.

Although Böhmer has simplified some dying procedures, the wool's hue and colorfastness are still vulnerable to a range of circumstances and variables – often unexpected ones. Böhmer recalls being summoned to a village early on in the project by two women who demanded to know why one could get a brilliant red and the other couldn't, despite the fact that they were both following the same recipe. He watched them go through the whole process using identical steps and, to his bafflement, reach undeniably different results. Finally, he noticed that they were drawing water from two different wells 500 meters (550 yards) apart, and suggested they switch wells for another attempt. When they did, it became apparent that one woman's well-water was more alkaline than the other's, and that this accounted for her brighter red.

DOBAG's goal of reviving traditional designs and, at the same time, encouraging innovation was not easy to achieve, for many women had long relied on the ready-made patterns farmed out to them by merchants, and had forgotten how to

play with design. Nineteenth-century village and nomad weavers, on the other hand, rooted in traditions dating back to the 12th century, used designs that "belonged" to their family or tribe, and generally followed their own lights in the empty spaces, or "ground," of the carpet, inserting symbols that often were far older than the craft itself – for instance, S-shaped figures that were thought to bring good luck to the owner.

In the early days of the DOBAG project, the women dredged up memories of carpets they had made or seen earlier – one recalled the design of the dowry carpet she had made 20 years before. The local mosque, which contained many layers of carpets donated over the years on the occasion of funerals or for other pious purposes, was a rich source to learn from. Ordinarily, a weaver can memorize a pattern after making it once or twice, and in time she might come to know 20 or more designs by heart.

DOBAG affected family life in the weaving villages by enabling the weavers to continue productive work at home during

the cold months. Summers, most Turkish village women work in the fields, but from September to May DOBAG women fit weaving in with their household chores. Working on a loom that, typically, is a major feature of a single room containing a wood stove, kitchen utensils and a stack of sleeping mats, a weaver can tie about 5000 knots in an uninterrupted eight-hour day. During the weaving season she may make about five carpets.

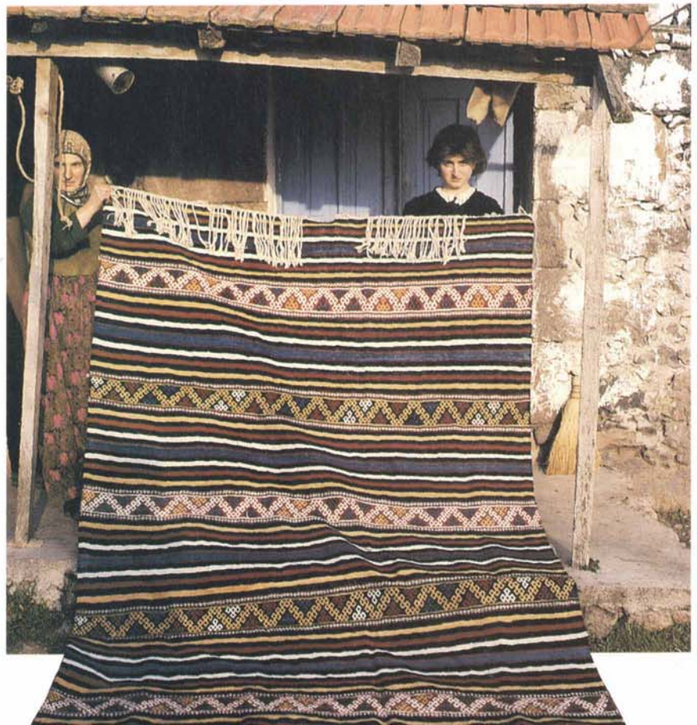
Traditionally, Turkish women work together, seated side by side before the loom – which accounts for the way the left side of some Anatolian carpets differs from the right one. Girls, who often leave school after five years and usually start weaving around age 12, help their mothers at the loom, and neighbors often help each other. When two women weave together, the woman who owns the loom chooses the design and the colors, and the finished product belongs to her. Then she helps her friend make a carpet in the friend's house. If they especially like their creation, they may weave their initials into the design.

On Fridays, the rugs from the Yuntdağ villages are taken to the DOBAG depot in the city of Manisa, where the women who wove them can be seen down on their knees and elbows, counting the warp and weft threads with a pencil. They multiply the two figures to get the number of knots in the carpet, which will determine their pay. One enterprising weaver in Ayvacık created a sensation a few years ago with a 740,000-knot carpet of approximately seven square meters (75 square feet) which was immediately snatched up by a visiting Londoner. Since then, a 25-square-meter (270-square-foot) rug has been sold to the British Museum.

DOBAG rugs now adorn walls and floors in homes and museums eastward to Osaka and westward to Los Angeles, and in 1989 the cooperative distributed $200,000 among its weavers – then all women. Since, a few young men have begun to take part in aspects of production, profit and prestige overcoming their reluctance to do what is traditionally women's work. Also in 1989, three villages in Yuntdağ decided that their cooperatives should be run by weaving women, thereby creating what is believed to be the first women's cooperative in Turkey.

Better clothes worn by DOBAG weavers' children, dowry gold flashing on the women's necks, secondhand television sets on which their families watch *Dallas*, built-on weaving rooms with large windows, piped water in some villages and even an occasional refrigerator – all these things make an impression on weavers

Weavers at work, above. The weft thread is pounded down, left. Below, a completed carpet is displayed. Another whole DOBAG carpet is shown at right.



outside the cooperative, and 100 or more families are clamoring to join. But the inability of the market to absorb more than about 1,200 rugs a year has kept DOBAG from accepting more members.

In Washington in 1987, Gayle Garrett, who teaches a course on Oriental carpets at Georgetown University and sells DOBAG carpets, arranged a beautiful exhibit of the rugs at the World Bank, and two lectures for Böhmer. If anyone lacking a passion for color attended his talk at the Textile Museum, they politely avoided the question that dealers, collectors and curators sometimes debate: Is there any real difference between synthetically and naturally dyed rugs? And if there is, does it matter?

One of Böhmer's applauders in the audience, Washington dealer Harold Keshishian, praises the DOBAG rugs but, like some of his colleagues, questions whether people can really see a difference in the color. "Face it," he says, "ninety-nine percent of the rugs on the market today are chemically dyed."

Those who do see a difference feel strongly that natural dyes, properly applied, are superior to synthetic dyes, but they find the quality they like difficult to describe, a matter of nuance. Nobuko Kajitani, conservator in charge of textile conservation at the Metropolitan Museum of Art in New York, describes it as an "esthetically comfortable feeling."

At least part of the debate between advocates of the two different paths to color can be resolved by a chemist. According to Dr. Frank Calogero, formerly at the University of Tennessee in Knoxville, there is a difference, but "each has its own mission." Calogero, an expert in fiber chemistry and dye processes, explains that synthetic dyes, with the exception of red, are more reliable, or consistent, and hence well suited for mass production.

Natural dyes, on the other hand, do produce a richer, softer color, says Calogero, but they are difficult to control, hence unsuited to producing millions of yards of identically colored yarn. Their impurities, which may comprise from five to 25 percent of the dye, consist of other hues that are similar to the main one, and "it is these mixtures," he says, "that make natural dyes so beautiful" and create their harmony with neighboring natural colors.

Still, vagueness befogs most discussions about color. Where one person will see some purple in a hank of gray yarn, another may see only gray. The difference is partly genetic, like the ability to curl one's tongue lengthwise, and partly a matter of experience. As for figuring out whether a particular rug is synthetically or naturally dyed, Powell describes the process but cannot explain it. "You look at it and look at it," she says, until it becomes clear it is one or the other.

Even less susceptible of explanation are the ways in which taste and values interact with perception and experience. While some people seek out the near-perfect evenness of a synthetically dyed carpet, others view this evenness as flat and uninteresting. In the latter group is Virginia Tyson, an experienced dyer, spinner and weaver in Potomac, Maryland, who finds that natural dye, precisely because of its unevenness, makes color vibrate or sparkle. And for some people this "imperfection," a sign of the artist's hand working natural substances from the garden or fields, has spiritual overtones.

The debate continues in part because DOBAG, in reforging the broken link between modern weavers and those of earlier centuries, has revived old questions in an age when better understanding of science enriches their discussion. At the same time, there is what Böhmer calls the "magical fascination" of unwritten history in the carpets, which eludes purely rational contemplation. Made by eyes and hands that relay the visions and beliefs of many centuries, the carpets draw the beholder to look and look and look – perhaps to see, if only for a moment, some part of what the weaver saw.

Jane Peterson, a Washington free-lance writer who has lived and traveled in the Middle East, is presently working on a book about homeless women. *She would like to thank Professor Donald Quataert of the State University of New York at Binghamton for his help in preparing this article.*

Klee, Windows and Palms
KUNSTHAUS ZÜRICH.

TRAVELS IN TUNISIA

WRITTEN BY JUNE TABOROFF

On April 6, 1914, after a year of planning and anticipation, painters Paul Klee, August Macke and Louis Moilliet sailed from Marseilles for Tunis. Equipped with watercolors, brushes, pens, pencils, sketchpads and notebooks — and with Macke's camera — the three set out on what they described as a *Studienreise,* or study trip, around Tunisia. It was an experience that was to leave an indelible mark on the artistic production of each of the young painters, and ultimately on 20th-century European art itself.

For Klee and Macke, Swiss and German respectively, the 1914 journey was not only their first voyage to North Africa: It was their first venture outside Europe at all. Moilliet, Klee's compatriot, had visited Tunisia twice before, in the summer of 1908 and again for three months in 1909-10, and it was his descriptions of the country that had impelled his friends to see it for themselves. And artistically, the prospect was heady stuff: Their fellow painters Kandinsky and Matisse had visited Tunisia and the trips had unquestionably influenced their painting. Finally, there was Jäggi, a Swiss doctor who lived in Tunis with his family. Moilliet had met him on his previous visits, and he had invited Moilliet to return and bring his old schoolmate Paul Klee. The die was cast.

Financial obstacles had already forced the three painters to abandon a planned trip in 1913, but now all three were subsidized by their families and patrons, and all expected to sell the works they were going to paint in Tunisia. Macke sold his brother's motorcycle to pay for his share of the trip, although, according to Klee, his art was already "selling pretty well." Moilliet offered to advance Klee money in exchange for paintings: Klee had been exhibiting widely for some two years, but had not yet begun to sell his work.

After only a day's voyage from Marseilles, the three painters reached the port of Tunis. "The harbor and city … were behind us," wrote Klee of his first glimpse of Tunisia, "slightly hidden. First, we passed down a long canal. On shore, very close, our first Arabs. The sun has a dark power. The colorful clarity on shore full of promise. Macke too feels it. We both know that we shall work well here."

Indeed, in the span of only two weeks, Klee created nearly 50 watercolors and hundreds of sketches and Macke took many photographs as well as making hundreds of sketches and watercolors. Moilliet worked at a more deliberate pace: Only three watercolors and five drawings are known from his stay in Tunisia, although he would gather a mental image-bank that he would use in his work for many years.

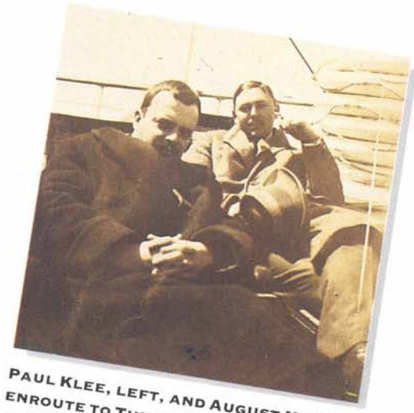
Klee's diary continues to describe their arrival: "The docking in the modest, somber harbor very impressive. The first Orientals we saw close up were those on the banks of the canal…." Macke, more than Klee and Moilliet, was fascinated by Tunisian dress and the Tunisian way of life, and produced a series of sketches that have both ethnographic and artistic value. With rapid strokes, he rendered scenes in the *suq*, or marketplace, and the narrow streets of the *medina*, or old city.

KLEE, BEACH AT ST. GERMAIN NEAR TUNIS
ULMER MUSEUM, PERMANENT LOAN OF BADEN-WÜRTTEMBERG STATE/KEGLER

The evening of their arrival, Dr. Jäggi took them on "a nocturnal walk through the Arab town." "Reality and dream simultaneously, and myself makes a third in the party, completely at home here. This will be fine," Klee wrote. The next day he remarked, "My head is full of the impressions of last night's walk. Art – nature – self. Went to work at once and painted in watercolor in the Arab quarter."

The old Arab town he was depicting was once one of the greatest cities in the world, and although it had lost some of its importance, it had lost none of its allure. An earlier traveler described it as "white, domed, studded with minarets, honeycombed with tunnel-like bazaars," and it remains unlike anything to be found in Europe. The narrow streets, bustling with crowds or quietly lined with palaces and historic buildings, inspired the artists. Klee noted, "Began the synthesis of urban architecture and pictorial architecture. Not yet pure, but quite attractive."

KLEE, BEFORE THE GATES OF KAIROUAN
PAUL KLEE FOUNDATION, KUNSTMUSEUM BERN
©1991, COSMOPRESS, GENEVA



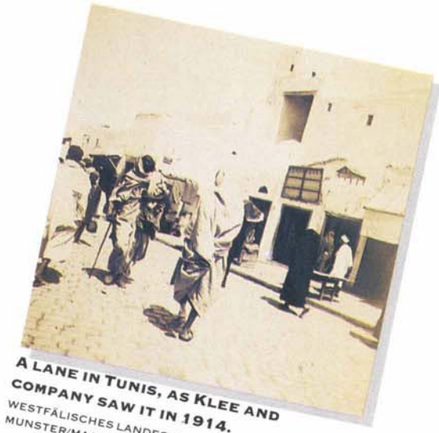
PAUL KLEE, LEFT, AND AUGUST MACKE ENROUTE TO TUNIS.
WESTFÄLISCHES LANDESMUSEUM, MÜNSTER/MACKE ARCHIV

What sort of place was the Tunisia that the three European artists discovered as their own continent hovered on the brink of the Great War? Tunisia entered its 33rd year of French occupation in 1914 in a period of general economic growth and active European immigration. By 1900, European settlers were estimated to make up almost five percent of the population: 25,000 were French, but they were outnumbered by some 70,000 Italians. Klee wrote in his travel diary, "Tunis is Arab in the first place, Italian in the second, and French only in the third. But the French act as if they were the masters." European influence was to be seen in the wide boulevards and the art-nouveau and *arte nova* buildings that had been constructed in the new areas of the city at the turn of the century. But the European aspects of Tunisia were a veneer, and they were of much less interest to the three painters than the country's traditional architecture, customs and landscapes.

Soon after their arrival, Jäggi – without a license – took the artists on a drive around town. Klee describes the ambience: "Heavy sirocco wind, clouds, the extremely subtle definition of the colors…. To the rear, a big lake [Lac de Tunis], which is said to dry up in the summer. A slight feeling of desert, threatening…. We walked a little. First into a park with very peculiar plantings. Green-yellow-terracotta." Klee was particularly attuned to cityscapes and landscapes, and took delight in the luxuriant gardens of Tunisia. The palm became one of his recurrent motifs in the Tunisian paintings and drawings.

Camaraderie, high spirits, and intense concentration marked the artists' time in Tunisia. As Klee's diary informs us and Macke's photographs illustrate, mornings and afternoons were spent drawing and painting outdoors, the days punctuated by meals and swimming. Temperatures in the mid-20's (mid-70's F) were a relief from the frigid climate of Switzerland and Germany. As guests of Jäggi and his family, the artists were shown the sights not only of Tunis, but also of Carthage and Sidi Bou Said, and invited to join the family at Jäggi's weekend house at the beach resort of St. Germain, southeast of the city. As Klee tells us, "August [Macke] … painted a plaster wall in the dining room [and was] immediately at home in the large format, a complete scene, donkey and master, etc. I contented myself with two small pictures in the corner…."

During their days in Tunis, the artists painted scenes from the harbor and from the beach of St. Germain. While there, Klee had an important realization. "Some



A lane in Tunis, as Klee and company saw it in 1914.
WESTFÄLISCHES LANDESMUSEUM, MÜNSTER/MACKE ARCHIV

Klee, Garden in St. Germain, The European Colony near Tunis
METROPOLITAN MUSEUM OF ART, BERGGRUEN KLEE COLLECTION 1984

Macke, Landscape with Cows and Camel
KUNSTHAUS ZÜRICH.

Macke, St. Germain near Tunis
STÄDTISCHE GALERIE IM LENBACHHAUS, MUNICH.

watercolors on the beach and from the balony... [c]ould have been painted near Marseilles just as well. In the second [watercolor], I encountered Africa for the first time.... The heat overhead probably helped." Klee now began to grasp the elements of Tunisia, its light, colors and forms. His diary reveals his impressions: "The prospect across the water was splendidly beautiful, but not extravagant. Everything has great dignity.... The evening is indescribable." He speaks of an "internal affair to keep me busy for the next few years" and notes that "the evening is deep within me forever."

Sidi Bou Said, a cliff-top village northeast of Tunis, was then as now a place of extraordinary charm. "Sidi Bou Said," wrote Klee, "the town that we first saw from the ship. Drove all the way up.... The town lies so beautifully up there and looks far over the sea.... Stopped by a garden gate and began a watercolor sketch."

The first building on the cliff top was a *ribat*, or fort, built in the early years of Arab rule, but the village grew up around the tomb of a 13th-century man revered for his virtue, Sidi Bou Said. By the turn of the century it was "discovered" by wealthy French and other expatriates who bought houses there and went to great lengths to preserve the town's charm. Even today, the impetus of civic pride has continued: The town was awarded an Aga Khan Architecture Award in 1980 for "the action of a community to conserve its town; an already old historic preservation law," the citation noted, "was able to preserve not only the picturesque but the very essence of the town."

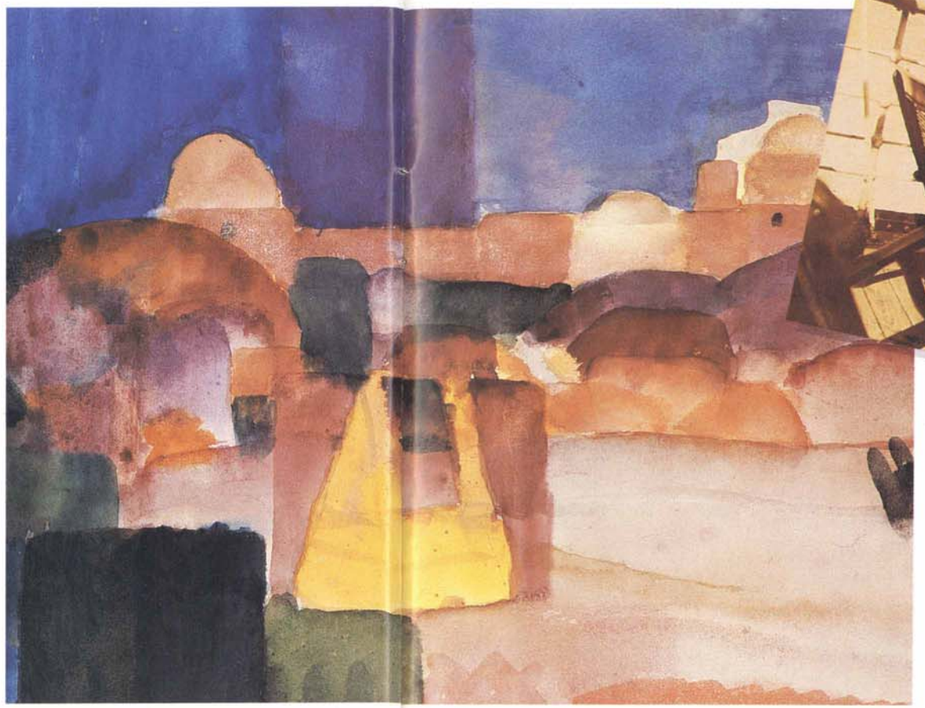
Almost every artist visiting Tunisia spends some time in Sidi Bou Said's central square, around the Café des Nattes. Klee portrayed this scene of cubical white houses and blue-studded doorways. Macke photographed the scene and sketched it.

Carthage was the next stop on the artists' itinerary. Klee notes, "We were soon to see clearly that Rome's victory over Carthage was absolute.... This site is more beautiful than the place where Tunis is situated ... more open to the sea, with more of a panorama...." Carthage was a subject of great romantic interest. The English landscape painter J.M.W. Turner produced a painting called *Carthage Story,* while Flaubert published *Salammbo,* a historical novel set in Carthage, in 1862 (See *Aramco World,* September-October 1988). But Klee, Macke and Moilliet's interests were directed elsewhere.

For a train trip south to Hammamet and Kairouan, the three artists were at the station at 6:00 a.m. Klee described the trip: "A small queue in front of the ticket booth.... Beautiful voyage. Serious forest.... We looked into a garden where a dromedary was working at the cistern. Downright biblical." They were excited by what they were discovering of the country.

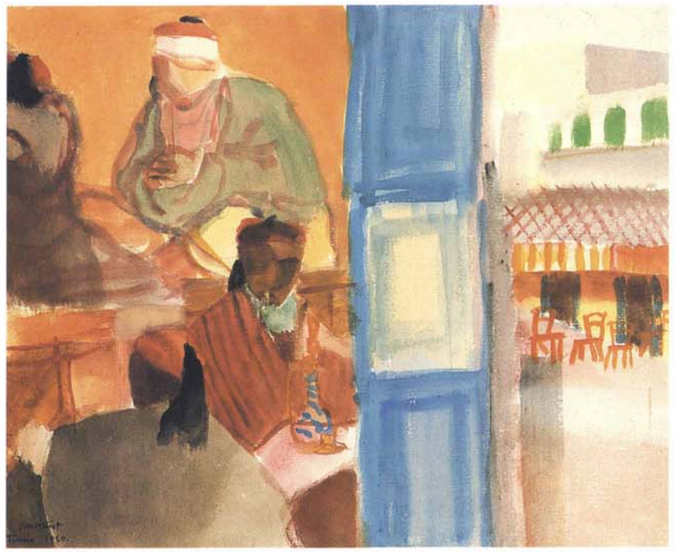
At the turn of the century, Hammamet had been a small fishing village which made some extra dinars by selling lemons from its dense citrus groves to Sicily for export to America. In the 1920's, the international set arrived, and soon Hammamet became part of the world's Orientalist legend of a "sensual" Tunisia. Today, with some 40 hotels, it is Tunisia's most important resort.

"The city is magnificent," related Klee, "right by the sea, full of bends and sharp corners. Now and then I get a look at the ramparts! In the streets more women are to be seen than in Tunis.... The reeds and bushes provide a beautiful rhythm of patches. Superb gardens in the vicinity. Giant cactuses form walls. A path with cactuses... Painted a good deal and sauntered around." Some of Klee's finest Tunisian works were painted in Hammamet, the landscapes and the garden scenes vibrant with color.

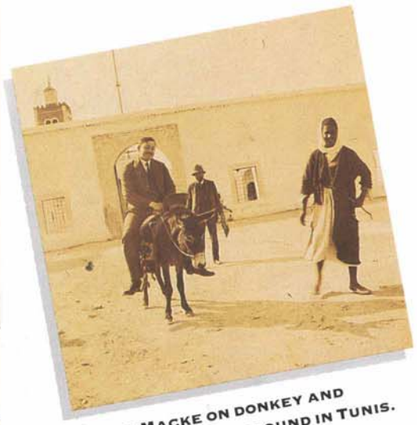


MOILLIET, KAIROUAN
RHEINISCHES BILDARCHIV KOLN/MUSEUM LUDWIG.

LOUIS MOILLIET RELAXES ABOARD SHIP.
WESTFÄLISCHES LANDESMUSEUM, MUNSTER/MACKE ARCHIV



MOILLIET, CAFÉ IN TUNIS, 1920
ÖFFENTLICHE KUNSTSAMMLUNG, KUPFERSTICHKABINETT BASEL.



AUGUST MACKE ON DONKEY AND PAUL KLEE IN BACKGROUND IN TUNIS.
WESTFÄLISCHES LANDESMUSEUM, MUNSTER/MACKE ARCHIV

They boarded the train again for Kairouan. "Magnificent trip through more and more desert-like country...," notes Klee. The three artists set out to discover "this marvelous Kairouan." They quickly found themselves in the midst of Tunisia's oldest Arab city, and one of the most important centers of Islam after Makka, Madina, and Jerusalem. Known historically for its magnificent architecture and as a center of learning, Kairouan became a successful market town for agricultural goods – apricots and almonds are grown nearby – and as a major producer of carpets and cigarettes.

"At first an overwhelming tumult, culminating that night with the *Mariage arabe...*," Klee recorded. "The essence of *A Thousand and One Nights,* with a ninety-nine percent reality content.... How intoxicating, and at the same time clarifying." The next morning the artists were out painting. Klee explains: "In the morning, painted outside the city; a gently diffused light falls, at once mild and clear.... In the afternoon, ... the mosque. The sun darted through, and how!... In the evening, through the streets. A café decorated with ... beautiful watercolors.... An evening of colors as tender as they were clear." Klee reached a new state of equilibrium as an artist. "I feel [my work] and it gives me confidence in myself without effort," he wrote. "Color possesses me. I don't have to pursue it. It will possess me always, I know it. That is the meaning of this happy hour: Color and I are one. I am a painter."

The next day Klee continued painting the cityscape. "In the morning, again painted outside the town, close to the wall, on a sand hill. Then went on a walk alone, because I was so overflowing, out through a gate, where a few trees stand."

The artists left Kairouan overwhelmed by their visual impressions. Klee felt that he must "be alone; what I had experienced was too powerful. I had to leave to regain my senses." Macke and Moilliet too "have had their [inner] experience," according to Klee. He characterized Macke as "facile and brilliant," and Moilliet as "dreamy."

Their brief but vivid fortnight in Tunisia over, they prepared for departure from Tunis. Klee mused, "Many watercolors and all sorts of other things. Most of it is inside me, deep inside.... I felt somewhat restless, my cart was overloaded...."

The years following the Tunisia trip brought dramatic changes to the lives of all three artists. Macke, indeed, met his death in Champagne less than six months later, in the first months of World War I. His letters from Tunisia had described the exhilaration he felt there: He was "like a bull which leaps from a dark stall into a clear arena, filled with colorful matadors." He speaks of "a joy in working that I have never known." Macke found his personal style during the last years of his life and was especially stimulated by the beauty of nature. The large body of work that he produced in Tunisia – watercolors, pen sketches, pencil sketches, and an oil painting – reveal much about his poetic view of the world. Moilliet, who lived until 1962, also went on to develop the vocabulary of images that he encountered in Tunisia.

At least as much as for his two companions, the Tunisia journey was profoundly important for Paul Klee, for it was during this time that he gathered and concentrated the power necessary to create his personal voice: The Tunisian experience seemed to release his gift for color and to point out to him the variety of patterns and rhythms of nature – yet it also changed the nature of his art away from figurative description and toward a form that he later described as "abstract, with memories."

All three artists left a legacy of intense and powerful works – and a key to the allure of Tunisia.

June Taboroff, who earned her Ph.D. at New York University's Institute of Fine Arts, writes about Middle Eastern arts and landscapes.

Images of Afghanistan

PREVIOUS SPREAD

Poplar Trees.

Women are washing dishes at the entrance of a typical mud-brick house. The mounds of a cemetery are visible in the distance. The poplar trees planted along an irrigation ditch behind the house will later be used for building. These mud-brick structures tend to be warm in winter and cool in summer and, aside from being somewhat dusty, can be quite comfortable. After a period of time, new living quarters are built and the old rooms become a barn or stable. A generation later the roof may be gone and the walls remain as part of a courtyard or corral; after that low walls may serve as a pen for smaller animals or as the wall around a garden.

PENTAX ES, 200MM SMCT LENS, KODACHROME II FILM

OPPOSITE

Light and Water.

In the shadow of the old citadel in Herat, between the woodcutter's yard and the spice market, stood this covered reservoir commissioned in 1634 by a Safavid governor. The photograph was made from another entrance on the opposite side.

PENTAX ES, 50MM SMCT LENS, GAF 500 FILM

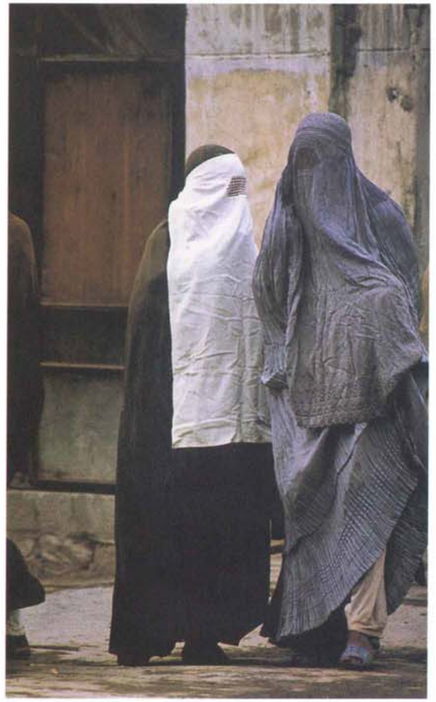
WRITTEN AND PHOTOGRAPHED BY LUKE POWELL

BELOW

Ladies of Qandahar.

Women wear the full veil in public in order to conform to Islamic teachings and to society's wish that they not be seen by males outside the immediate family, and in order to protect hair, clothing and jewelry from dust, mud and the envious. I am an American and, given the level of violence against women in my own country, it is inappropriate for me to comment on the place of women in other societies. In my experience, most Western women traveling in Afghanistan found they were often ignored; when not, they were generally treated with respect, and occasionally with gallantry.

PENTAX ES, 200MM SMCT LENS, HS EKTACHROME FILM



PREVIOUS SPREAD

Lavender Flowers Near Meymaneh.

Most maps of Afghanistan show a road that makes a great circle around the country, with other roads that radiate from the ring toward Mashhad, Peshawar, Quetta and points in Turkmenia, Uzbekistan and Tajikistan. Since the 1960's, these roads are all hard-surfaced highways – except the northern route from Sheberghan to just northeast of Herat. This is what the road was like: a trail for four-wheel-drive vehicles only, and entirely impassable for many weeks of the year.

NIKON, 85MM NIKKOR LENS, KODACHROME 64 FILM

OPPOSITE

Spiral.

Much of the success of the great conqueror – and builder – Timur, called Tamerlane in the West, was due to his ability to use both the resources of the steppes and those of the cities. His heirs, who ruled for a century after his death, became patrons of the arts, forging a new culture in which the high urban civilization of Persia and the nomadic civilization of Central Asia were preserved, intertwined and revitalized. Here is a detail from a mosaic-covered shrine in Balkh in northern Afghanistan – once called "the mother of cities."

PENTAX ES, 200MM SMCT LENS, KODACHROME II FILM

LEFT

The Slingshot.

This young boy is carrying a slingshot around his neck. The respect men often showed to women traveling in Afghanistan was not always extended to photographers by small boys. Probably due in part to the failure of many tourists to be unintrusive and polite while taking pictures, anyone with a camera might be fair game for boys with rocks. Most of the time it was a grand game, though, and in the end I usually had cordial relations with my young hosts.

NIKON, 50MM NIKKOR LENS, EKTACHROME 200 FILM

PREVIOUS SPREAD

Grain Market.

These men have come from farms and villages to a weekly market at Bala Morghab, several days' ride by four-wheel-drive truck from the nearest paved road, in good weather. I usually felt quite safe in Afghanistan, and my slight physique worked to my advantage. My roamings usually led me out across the countryside from dawn until sunset, and rarely did I go without offers of food and tea – especially tea, very sweet tea.

NIKON, 200MM NIKKOR LENS, EKTACHROME 400 FILM

LEFT

The Young Shepherd.

A shepherd boy and his goats follow a trail along a cliff overhanging the Darya-ye Qonduz, or Kunduz River, in northeast Afghanistan, in the area known in antiquity as Oxiana or Bactria.

PENTAX ES, 200MM SMCT LENS, HS EKTACHROME FILM

RIGHT

Friday Mosque.

Though many of its glazed tiles have been replaced subsequently, the Friday Mosque in Herat was given its present form in the closing years of the 15th century. But it was not always the largest mosque in the city: An enormous complex also built by the Timurids, the Mosque and Madrasa of Gawharshad, was located to the north. It was dynamited by the British in 1885.

PENTAX ES, 200MM SMCT LENS, HS EKTACHROME FILM

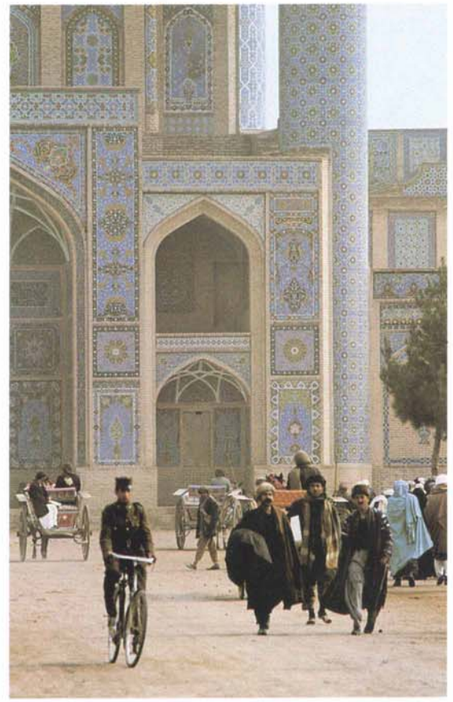
Luke Powell, who visited Afghanistan several times between 1971 and 1978, now lives in Vermont and prints his photographs by the dye-transfer process.

NEXT SPREAD

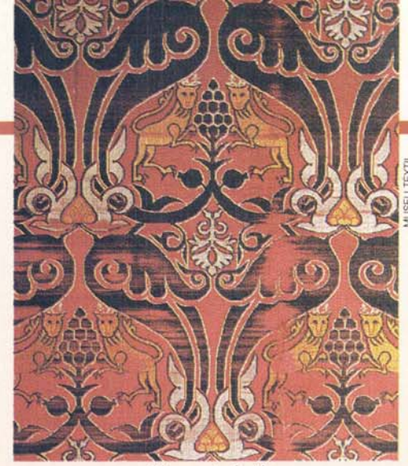
City Gates.

In antiquity, especially in Asia, the gates of a city were part of a larger structure that often had several levels, with towers and interior rooms. The connecting walls and arch above this gate have collapsed, and this is all that is left of one of the gates of Tashkurghan, a city that housed a thousand shops and a score of caravanserais when it was an important trading center on the many-branched Silk Roads. Alexander the Great, when he marched through Bactria, knew it as Aornos; it is also known today as Kholm, the name of an ancient city whose ruins lie a few kilometers north.

PENTAX 6X7, 300MM SMCT LENS, VERICOLOR FILM



EVENTS & EXHIBITIONS



MUSEU TÈXTIL

Hispano-Arab silk

Silk: *Legend, Power and Reality.* This exhibition, a Spanish contribution to UNESCO's "Silk Roads, Roads of Dialogue" program, acknowledges the important role of the Arabs in introducing silk to Western Europe via Andalusia. The exhibition shows how, from the seventh to the 12th centuries, Arab or Islamic powers controlled the commercial land and sea routes linking the West with the silk markets of the East. The Arabs also introduced silk cultivation to Spain and the rest of Europe, laying the foundation of an industry that survives to the present day. The exhibition looks at the evolution of design in silk fabrics, from the workshops of Akhmim, Egypt, between the fourth and sixth centuries BC, through the Arab period, to the fashions of the 18th-century French court, and finally to the "democratization" of silk in the 19th century. The exhibition is organized by the Spanish Silk-Route Commission, in cooperation with the Council of Europe. Museu Tèxtil, **Terrassa, Spain**, through December 31, 1991.

Court Arts of Indonesia. Some 160 works of art dating from the eighth to the 20th century reflect the 1000-year traditions of the royal courts of Indonesia. Sackler Gallery, **Washington, D.C.**, May 19 through September 2, 1991; Natural History Museum of **Los Angeles** County, October 19, 1991 through January 5, 1992.

The Here and the Hereafter: *Images of Paradise in Islamic Art.* An exhibition of more than 50 works that demonstrate the cultural importance of the rich and complex Islamic vision of the afterlife. The display includes calligraphy, illuminated manuscripts, prayer rugs, mosque lamps, ceramics and embroidered silks. Dartmouth College's Hood Museum of Art, **Hanover, New Hampshire**, through May 19, 1991; The Asia Society Galleries, **New York**, June 27 through September 8, 1991; Bowdoin College Museum of Art, **Brunswick, Maine**, September 26 through December 5, 1991.

The Coroplast's Art: *Greek Terracottas of the Hellenistic World.* This exhibition features over 50 terracotta works illustrating the everyday life and spiritual expression of Hellenized communities in the Mediterranean, Asia Minor, Egypt and even the Arabian Gulf, from the late fourth to the first century BC. Harvard University's Sackler Museum, **Cambridge, Massachusetts**, May 25 through July 28, 1991.

Antoin Sevruguin: *Photographs of Iran.* Studio and other portraits of rulers, citizens, tourists and mendicants in the Iran between the 1880's and the 1920's. Sackler Gallery, **Washington, D.C.**, through May 26, 1991.

Arab Art: *The Past Four Decades.* Works by 20 artists from eight Arab countries constitute a mini-retrospective of modern Arab art. The exhibit, marking the 40th anniversary of AMIDEAST, shows paintings, sculpture and works on paper by Arab artists assisted by that non-profit educational organization over the years. Alif Gallery, **Washington, D.C.**, through May 31, 1991.

Beyond the Pyramids: *Geometry and Design in the Carpets of Egypt, 1450-1750.* The Textile Museum's unparalleled collection of classical Egyptian carpets is featured in an exhibition exploring geometry and design in the Mamluk and Ottoman periods. The Textile Museum, **Washington, D.C.**, June 1, 1991, through February 16, 1992.

The Sigmund Freud Antiquities: *Fragments from a Buried Past.* On display are 65 Greek, Etruscan, Roman, Egyptian and Asian artifacts drawn from the extensive Freud collection in London. The exhibit is supplemented with books, manuscripts and photographs from the doctor's library. **New Orleans** Museum of Art, through June 3, 1991.

Crushed Lapis and Burnished Gold: *The Art of Illumination* explores the embellishment of manuscript pages with designs in brilliant gold, lapis lazuli and other vibrant colors, an integral part of book production in the Muslim world since the ninth century. Sackler Gallery, **Washington, D.C.**, June 9 through December 8, 1991.

Saints, Shrines and Pilgrimages. Objects, paintings and photographs from India, Iran, Turkey and other Islamic countries are used to explore Muslim piety and religious history. Harvard University's Sackler Museum, **Cambridge, Massachusetts**, through June 9, 1991.

Traditional Crafts of Saudi Arabia. The John Topham collection of weavings, jewelry, a Bedouin tent, and metal, wooden and leather handicraft objects. High Museum at Georgia-Pacific Center, **Atlanta, Georgia**, June 17 through September 13, 1991.

Egypt: *The Search for Immortality.* The ancient Egyptian death cult and concepts of eternity are illustrated in a special exhibit of some 130 treasures covering four centuries. Römer- und Pelizäusmuseum, **Hildesheim, Germany**, through June 16, 1991.

Islamic Art and Patronage: *Selections from Kuwait.* More than 100 masterworks of Islamic art of the eighth to 18th centuries drawn from one of the world's foremost private collections. Emory University Museum of Art & Archaeology, **Atlanta, Georgia**, June 19 through September 22, 1991; Virginia Museum of Fine Arts, **Richmond,** November 5, 1991 through January 19, 1992.

Early Islamic Textiles from the Mediterranean Area. The exhibit features silk and gold ornaments, printed cottons and drawloom-woven silks. Some 50 textiles are on display from such locales as Egypt, Syria, the Levant and Spain, covering the seventh to the 15th centuries. **Cleveland [Ohio]** Museum of Art, through June 21, 1991.

Another Egypt: *Coptic Christians at Thebes.* Objects from the daily lives of Egyptians who, from the seventh to eighth centuries, lived in the shadow of pharaonic temples and ruins on the west bank of Thebes (modern Luxor). Oriental Institute Museum, **Chicago,** through June 30, 1991.

Current Archeology in the Ancient World. A series of lectures on current research and discoveries. Upcoming: the origins of animal domestication in the Near East, restoration efforts at Zugan in northeastern Iran, latest work at Mari in Syria, recent discoveries at Tanis in Egypt. Musée du Louvre, **Paris,** through July 10, 1991.

The Sculpture of Indonesia opened the Festival of Indonesia in the United States with 135 masterpieces from the classical eighth to 15th centuries of the world's most populous Muslim country. Metropolitan Museum of Art, **New York**, through August 18, 1991; Asian Art Museum of **San Francisco**, September 28, 1991, through January 5, 1992.

Beyond the Java Sea: *Art of Indonesia's Outer Islands* explores the cultural life and thought of this Muslim nation's Outer Island peoples, as expressed through their traditional arts. National Museum of Natural History, **Washington, D.C.,** through July 25, 1991.

A Diplomat's Orient. French diplomat Jacques d'Aumale collected more than 1000 costumes and pieces of jewelry from the Near and Far East while posted in Istanbul, Cairo and Jerusalem from 1914 to 1938. Musée de l'Homme, **Paris**, through September 2, 1991.

The Arts of the Persian World: *The A. Soudavar Collection.* Some 100 works including paintings, calligraphy, manuscripts and metalwork trace the evolution of Persian art and its impact on other cultures from prehistoric times through the 19th century. **Los Angeles** County Museum of Art, September 5 through November 10, 1991.

Yemen: *A Culture of Builders.* A photographic and videotape exhibition sponsored by the American Architectural Foundation (The Octagon) takes an artistic look at the landscape, built form and ornamentation that characterize Yemeni architecture. University of New Mexico School of Architecture and Planning, **Albuquerque**, September 9 through October 18, 1991; Ball State University College of Architecture and Planning, **Muncie, Indiana**, November 4 through December 13, 1991.

An Old Turkish House. Visitors will experience the ambience of an interior of a late Ottoman house in 18th- and 19th-century Istanbul. Room displays include richly embroidered textiles, garments, rugs and a wedding dress with trousseau. The Textile Museum, **Washington, D.C.,** September 13, 1991, through February 16, 1992.

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

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

Jordan: *Treasures from an Ancient Land.* First proposed by Queen Noor al-Hussein and billed as the first-ever exhibition in the United Kingdom of the art and archeology of Jordan, this presentation brings together more than 600 of the finest objects from top collections. **Liverpool** Museum, **England**, through November 3, 1991.

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

Pre-Islamic Arabia. A preview of pre-Islamic antiquities – inscriptions, sculpture, pottery and architectural elements from the Arabian Peninsula – which will be exhibited later at the Louvre. Institut du Monde Arabe, **Paris**, until 1993.

Nomads and Nobility: *Art From the Ancient Near East.* Spectacular artifacts from the pre-Islamic Middle East, primarily gold, silver and bronze, but including ivory and ceramic objects. Sackler Gallery, **Washington, D.C.**, continuing indefinitely.

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

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

WRITTEN BY TOM PLEDGE
PHOTOGRAPHED BY RON JOHNSON

Fighting the Gulf Oil Spill

The oil slick, seen as red in this Landsat satellite image, extends some 40 miles into the southern reaches of a bay near the hook-shaped Saudi island of Abu 'Ali.

EOSAT

WAR WITHIN A WAR

Fighting the Gulf Oil Spill

A.Y. DOBAIS

The first word of a significant oil spill in the Arabian Gulf reached Saudi Aramco in a telephone call at two a.m. on Friday, January 25th.

A security officer woke Abdulla Zaindin, Aramco's global oil spill coordinator, to report "a lot of oil in the water in the Kuwait-Khafji area," near Saudi Arabia's northern border.

"The mother of all oil spills," as it came to be called, had arrived.

Later that same day, the news media reported from Washington that the White House and the Pentagon had charged that Iraq was deliberately pumping huge amounts of crude oil into the Gulf.

After non-stop telephone consultations on Friday, the company's 11-member Oil Spill Committee met in emergency session at Saudi Aramco headquarters in Dhahran on January 26th. The committee makes policy decisions and commits manpower, equipment and material to oil spill protection efforts which affect the company and its affiliates, or other members of the Gulf Area Oil Companies Mutual Aid Organization (GAOCMAO).

Experienced oilmen, the committee's members knew that within days the oil would probably be drawn south into Saudi waters by prevailing winds and currents. And oil in the water could shut down all of the kingdom's offshore crude oil production and, worse, close onshore desalination and power plants that use seawater to produce drinking water and electricity for military and civilian use.

Less than one part of oil in a million parts of seawater could close vital facilities.

Saudi Aramco already had a contingency plan in place that detailed a coordinated, company-wide response to a major oil spill. The plan established priorities, in this order: to protect human life, prevent or reduce the flow of oil from the source, protect marine environment and property, and minimize economic loss.

But the plan hadn't anticipated the unique problems involved in coping with a massive oil spill in the midst of a shooting war.

The Gulf conflict made it impossible to carry out at least some key parts of the plan. There was no way, for instance, to get to the source of the spill – a primary goal of any oil-spill control effort – because the spill was in the middle of the combat zone. Even reconnaissance flights to determine the size of the spill and the direction it was moving were circumscribed.

"No one in the world has had an experience like that," Zaindin said. "We didn't know how large the oil spill was, when it would show up in Saudi waters, where it was, or what resources we would need to deal with it."

A Saudi Aramco employee, above, recovers oil near Jubail, helping to protect the largest desalination plant of its kind in the world.

Yet the charge that the spill had been deliberately caused came as no surprise. "We knew the Iraqi government had been threatening to 'turn the Gulf into flame,'" committee chairman Dhaifalla A. Faris al-Utaibi said.

"They planned to release oil and ignite it in an attempt to stop any amphibious landings. We had met about that threat and were getting prepared for such an event."

No one was prepared, however, for the sheer volume of oil that had apparently been dumped into the Gulf.

On the basis of initial US estimates given to the Oil Spill Committee on January 26th, it appeared that the northern Arabian Gulf might have been hit with the largest oil spill ever, perhaps larger than any experienced before – including the previous record spill, the 4.2 million barrels spilled over 40 days from a well blowout in the Gulf of Mexico in 1979.

"I was prepared in my mind for something large," Zaindin said, "but not for an oil spill of anything like that size."

Under Saudi Arabia's National Oil Spill Contingency Plan, Aramco's responsibility was to take care of its own facilities, then assist with others as required.

The committee acted quickly, approving at its first meeting immediate charters of oil-spill control vessels and the purchase of oil barrier booms and dispersants wherever they could be found, and requesting permission from the military for aerial spraying of dispersants.

The committee also activated the oil-spill response team, a pre-designated group of key people who would be pulled away from their regular jobs and put into the field as on-the-scene directors of the oil-spill protection campaign.

Finally, Saudi Aramco decided to let the world know it could handle the threat to its facilities, so vital to the war effort. At a news conference, senior vice president Abdelaziz M. al-Hokail was spokesman for the company.

"We feel quite confident at this time that we will be able to emerge from this incident without any effects on our oil production, processing or exporting capability," he said at a January 27th news conference in the Dhahran International Hotel, headquarters for the news media during the Gulf war.

Al-Hokail acknowledged the probability of "serious" environmental effects from the oil-spill, but he said that "critical [industrial] facilities that use seawater for cooling purposes or as a desalination source have already been well protected and will, therefore, not be affected."

Oil encroaches on the Saudi coast, above. Fishing boats at Manifa, below, lie idle in a slick. The fishing industry was affected by the spill.

It was Mike Erspamer's job to keep that promise. Manager of terminal operations at Ras Tanura – Saudi Aramco's largest tank farm and export terminal – he was the head of the newly activated oil-spill response team; he and his men were setting up a control center at Tanajib even as al-Hokail spoke.

Most of the company's oil-spill protection manpower and equipment was concentrated at its two northern-most installations, the oil desalting plant at Safaniya and the reverse-osmosis water desalination plant known as Tanajib. Saudi Aramco also had oil-spill protection and planning responsibilities at some non-Aramco facilities, among them the Aziziya desalination plant near al-Khobar, the Qurayya thermal power plant, and the desalination plant at Jubail, the largest such facility in the world, 120 kilometers (75 miles) south of Tanajib.

Aramco's Safaniya plant, 96 kilometers (60 miles) south of the Kuwait border, removes salty water from nearly 2.7 million barrels of oil drawn daily from the world's largest offshore oil field. Tanajib, 24 kilometers (15 miles) south of Safaniya, was especially critical because it supplied some 1.5 million liters (400,000 US gallons) of water daily to allied military forces in the region, as well as water for the Aramco work force.

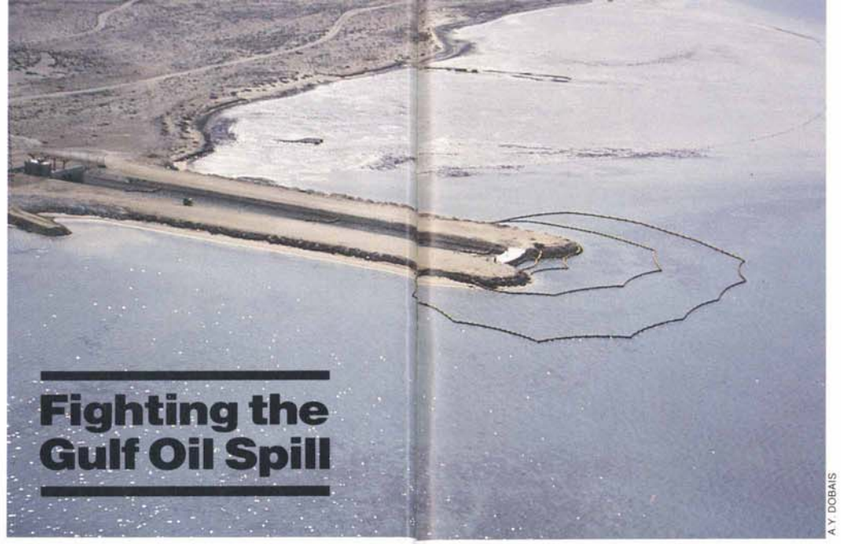
The delicate osmotic membranes at the Tanajib plant could be fouled by as little as five cubic centimeters of oil – a single teaspoon – dispersed in 5000 liters of water (1320 US gallons), forcing the plant to shut down. Safaniya could tolerate up to five times that concentration of oil, but it too was vulnerable.

The seawater intakes at Safaniya and Tanajib are protected by parallel stone breakwaters extending about 820 meters (2690 feet) into the Gulf and connected by a 90-meter (295-foot) seawall at the far end. The walls are made of loosely piled uncut rock, and are permeable to seawater.

The box-shaped intake channel had already been lined with and crisscrossed by deflection booms when Erspamer and his crew arrived. So they set about building a system of booms outside the seawalls to deflect oil out of the area.

In the first week after the spill, two cooperatives of which Saudi Aramco is a member – the Oil Spill Service Center Cooperative in Southampton, England, and GAOCMAO – sent nearly 70 tons of booms and skimmers to Aramco's operating area. By working around the clock, the team managed to deploy most of that material as soon as it arrived. In the first seven days, they deployed 11.2 kilometers (seven

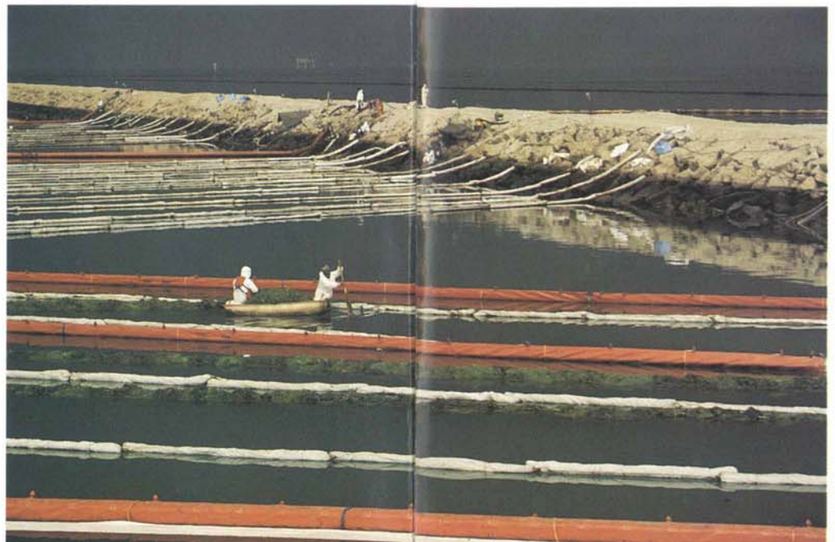
Fighting the Gulf Oil Spill



A.Y. DOBAIS

Deflection booms surround the end of a seawater intake on the Saudi coast, above. Oil-spill worker inspects storm-damaged booms on a beach.

Oil-spill teams worked long hours installing, repairing and repositioning booms, above. Intake channels were crisscrossed with booms to deflect oil, below.



miles) of protective booms outside the intake channels, and set about 100 pilings in the seafloor to secure the booms. The back bays, shallow inlets south of Safaniya and Tanajib, were also boomed off and readied as secondary water sources should the plants' main ones become unusable.

The first concentration of floating oil arrived in Safaniya in early February, and with it came a major disappointment. The dispersant chemicals, mainstays of other spill-fighting operations, didn't work. The oil had been in the water too long and its lighter components had evaporated, leaving behind heavier oil impervious to the chemicals.

The system of booms and skimmers became both the first and the last line of defense.

Soon the weather turned sour as well. Waves up to two meters (six feet) high, kicked up by strong northwest winds, battered the outer lines of diversion booms. By the afternoon of February 4th, patches of thick brown oil were reported outside the diversion booms at Safaniya, and windrows and ribbons of oil sheen were showing inside the booms – but the oil had still not penetrated the intakes.

"We must have more absorbent boom and skimmers ready to take care of what may get by the outside booms," Erspamer warned Dhahran. "Protective measures inside the seawalls appear to be working, but outside they're just not standing up to extreme weather conditions."

Excerpts from Erspamer's daily reports to Dhahran during the next several days tell of his concerns:

"Expedite more material .... Must have absorbent booms .... Contractors advise that their people will not drive or operate equipment in the war area .... Some way must be found to seal the porous walls of the seawater intakes."

Aramco-affiliated offices in Dhahran, Houston, Leiden, and New York were searching out and buying oil-spill protection equipment around the world. Vendors' stocks were severely depleted, however, and, adding to the difficulty, commercial flights to Dhahran and Riyadh had been canceled when the air war started. It took ingenuity, constantly renewed, to get whatever equipment could be found transported into eastern Saudi Arabia.

Booms from different manufacturers didn't lock together well once they were bought, imported and placed in service. To mate different brands, makeshift clasps had to be devised on the spot. Those often broke in high seas.

What's more, the anchors that apparently successfully held the booms in place elsewhere in the world didn't hold in the sandy bottom and the rough weather that prevailed in the Arabian Gulf.

As soon as a repair was made in one area, something broke in another. There was no getting ahead, it seemed: It was all the crews could do to stay even.

Then nature threw the oil-spill effort another curve. The wind backed around unseasonably from northwest to southwest, and the strong southwest winds pushed oil that had already been diverted around the intake channels back up against the unprotected south side of the porous seawalls.

"Our basic thinking was good, but it only took into account the wind coming out of the prevailing direction, which was north and northwest," Erspamer said. "We learned that you had to divert oil from both sides."

By now men had been fighting against the oil and the forces of nature for 16 to 18 hours a day, seven days a week, for almost three weeks.

The beaches they fought on had a nightmarish look to them. Where turquoise waters once danced, a sullen black glair of oil heaved and bubbled. Bodies of dead seabirds littered the shore. The air smelled of oil and tasted of oil.

On the rocky seawalls, scores of men worked day and night, moving and replacing booms, running skimmers to suck oil out of the intake channels. It was a treacherous place to work: Some rocks were loose and wobbly, some were slick. A slip could bring a bone-jarring fall or a plunge down into oily water.

The divers, between 55 and 60 of them, had "an especially depressing, messy job," as one of them described it. They worked from sunup to sundown, and sometimes longer, in chilly, oil-covered water that seeped into their wetsuits and coated and chapped their skin.

Their main job was to install, repair and reposition the booms, sometimes moving the same boom two or three times in a day. To do so they wrestled with boom anchors improvised from two-ton pieces of pipe, replacements for the regular 23-kilogram (50-pound) boom anchors that wouldn't hold here.

"Those guys worked a tremendous job under the most difficult conditions. It was very, very uncomfortable and dangerous for them," Erspamer said.

The sounds of war never became quite routine enough to ignore: the distant rumble of artillery fire, the explosions as mines discovered in nearby waters were detonated by allied navies, the eerie sound – like a concussion in the air, one worker described it – when the US battleships fired their huge 16-inch guns.

Occasionally, the workers found, the shooting was at them.

"I remember the Thursday morning we were out getting some booms deployed off Safaniya pier. Three rockets flew over our heads and exploded in the water about 1000 feet (300 meters) off the pier. That got everyone's attention, " Erspamer said.

Satellite photos, the main source of oil-spill location information, showed what appeared to be huge patches of oil up to 160 kilometers (100 miles) long lingering in the northern Gulf. The patches seemed to break up and reform from day to day, like the patterns in a kaleidoscope.

At one point, weighted plastic sheeting seemed to be the solution to the problem of the porous seawalls. Ten thousand meters of sheeting – more than six miles – were draped over the outside of the walls. The attempts failed: The water just worked its way up under the plastic.

So the oil-spill team invented a better way – sand berms. With plenty of construction equipment and plenty of sand around, they made breakwaters of sand along each side of the seawalls. They also built sand berms to deflect water around the seawater intakes. Eventually, to everyone's relief, they topped the seawalls themselves with sand so vehicles could drive on them.

Sand proved more durable than booms and much less labor-intensive to maintain. The berms could be built so as to trap as well as deflect oil. Then they became driveways for vacuum trucks to reach the trapped oil, suck it up and recover it.

Saudi Aramco constantly added manpower and equipment to the oil-spill effort. The force grew to a peak of 450 men, 20 vessels, 40 vacuum tank trucks, 35 skimmer boats and 40 pieces of construction equipment.

At last, in late February, the weather calmed and the defenses could be consolidated. Berm construction speeded up, offshore booms were repaired or replaced and new booms were added.

Best of all, very little new oil was coming down from the north. Those dark spots on the satellite photos that had looked like huge patches of oil were apparently caused by large areas of oil sheen that had drifted far from the sources of the spill.

Well into April, however, some 2000 to 3000 barrels of oil a day were still spilling into the Gulf from damaged facilities in Kuwait. The flow was finally stopped in early May.

By the time a Gulf War cease-fire was announced, the heaviest concentrations of oil had slipped south of Tanajib.

By an accident of nature, Manifa Bay and a large, shallow bay called Dawhat al-Dafi, south of Tanajib, were positioned to catch the oil as it moved south. These remote, unspoiled bays trapped several hundred thousand barrels of oil, sparing the remainder of Saudi Arabia's east coast considerable additional environmental injury. The company established about a dozen recovery sites around the bays, in some cases building roads so vacuum trucks could reach oil-impacted areas.

To lessen the damage further, large Aramco skimmer ships were assigned to pick up oil in the open Gulf, each barrel recovered representing one fewer barrel of environmental poison to hit a beach or foul one of the many shallow bays where marine life begins.

Saudi Aramco also participated in efforts to protect wildlife and the environment by distributing protective material and equipment, and by offering its expertise and logistical support to other oil-response teams under the direction of the Saudi Arabian government. Hundreds of Saudi Aramco employees joined the volunteer effort to rescue and clean seabirds, turtles and other animals.

The whole oil-spill protection campaign – protecting facilities, protecting the environment – relied on resources gathered worldwide. Oil-spill fighting equipment came from Japan, Germany, New Zealand, France, the United Kingdom, Canada, the United States and The Netherlands, including more than 32,000 meters (20 miles) of offshore booms, more than 30,000 meters (19 miles) of oil-absorbent booms and 2000 meters (1.24 miles) of bay booms, plus at least 16 skimmers. Twenty-four chartered planes brought the urgent cargoes to Dhahran – including the huge Soviet-built Antonov-124 (See *Aramco World*, March-April 1991).

By the end of the first week of May, Aramco had recovered some 900,000 barrels of oil from the Gulf. Though its size was never definitively established and its source has never been proved beyond question, the spill had certainly been massive. Yet it had failed to do any industrial damage, or curtail the production on which the allied military effort depended.

Thanks to an all-out effort, Aramco's war within a war had been won.

Tom Pledge, a 15-year veteran with United Press International, has been working in Dhahran as a freelancer for several months. A future article will take up the oil spill's environmental impact.

TOUGH QUESTIONS

Helen Thomas of United Press International is a Washington institution. America knows her as the short woman with the gravelly voice who rises at presidential press conferences to ask the first or second question – tough, emotional, theatrical questions that other reporters occasionally find offputting – and for her signature closing, "Thank you, Mr. President." Thomas shares the first-question privilege with her competitors at the Associated Press, but the right to close the conferences is traditionally bestowed on the reporter who has covered the White House the longest. Helen Thomas wins this honor hands down: She has been at her post through seven presidential administrations.

Thomas is not known as a journalist with inside sources; her strong suit has always been day-to-day events. Along the way, she has broken big stories – that Richard Nixon's speechwriters were working on a resignation statement – and trivial ones – that one of Caroline Kennedy's hamsters had died.

This kind of reporting may never win Thomas a Pulitzer Prize. But what she does, Sam Donaldson observes, is question, harangue, cajole and coax the president into making the news that, in turn, "becomes the grist for everyone else's stories and everyone else's thoughts."

Thomas's parents, George and Mary Thomas, arrived at Ellis Island from Lebanon in 1903 and worked their way to Lexington, Kentucky. Neither could read or write. George bought a wagon, loaded it with linens, candy, tobacco, fruits and vegetables and took these into the countryside to sell. Soon he opened a store, and kept his books and inventory by memory.

Helen was born in 1920, the seventh of nine children. Four years later, the family moved to Detroit. Her father, Thomas believes, "was a man who understood opportunity."

At the dinner table the whole family would debate the issues of the day. Mary Thomas was the more passionate parent, says Helen's older sister Isabelle, with ironclad views of right and wrong. But if there was one overriding opinion in the household, it was that every child had to get a college education. Eventually, all nine did. George and Mary "put the highest stock in education," Helen Thomas says, "because they had none."

Thomas likes to say she "assigned herself" to cover the White House, but former boss Grant Dillman says that's not quite right. UPI vice president Julius Frandsen "sent her there to cover Jackie [Kennedy], but he underestimated her," Dillman says. "She was soon poking her nose into all aspects of the news of the day as well."

Through the years, Thomas's questions have become notorious – praised as tough, irreverent and populist; criticized for a pro-Palestinian bias, theatricality and lack of sophistication. Some reporters complain that Thomas too often presents her own position on issues; others say her adversarial stance reflects a relationship with the White House that more reporters should emulate. Thomas believes that, as a reporter, she is a surrogate for the public. "Press conferences," she says, "are the only forum … where the president can be questioned."

She has great influence with her peers, according to White House press secretary Marlin Fitzwater. "There are two or three people in the press corps who can guide it," he says. "If any of these people go after a story, they take the whole press corps with them. Helen is clearly one of those people."

Amanda Spake is a senior editor of The Washington Post Magazine.

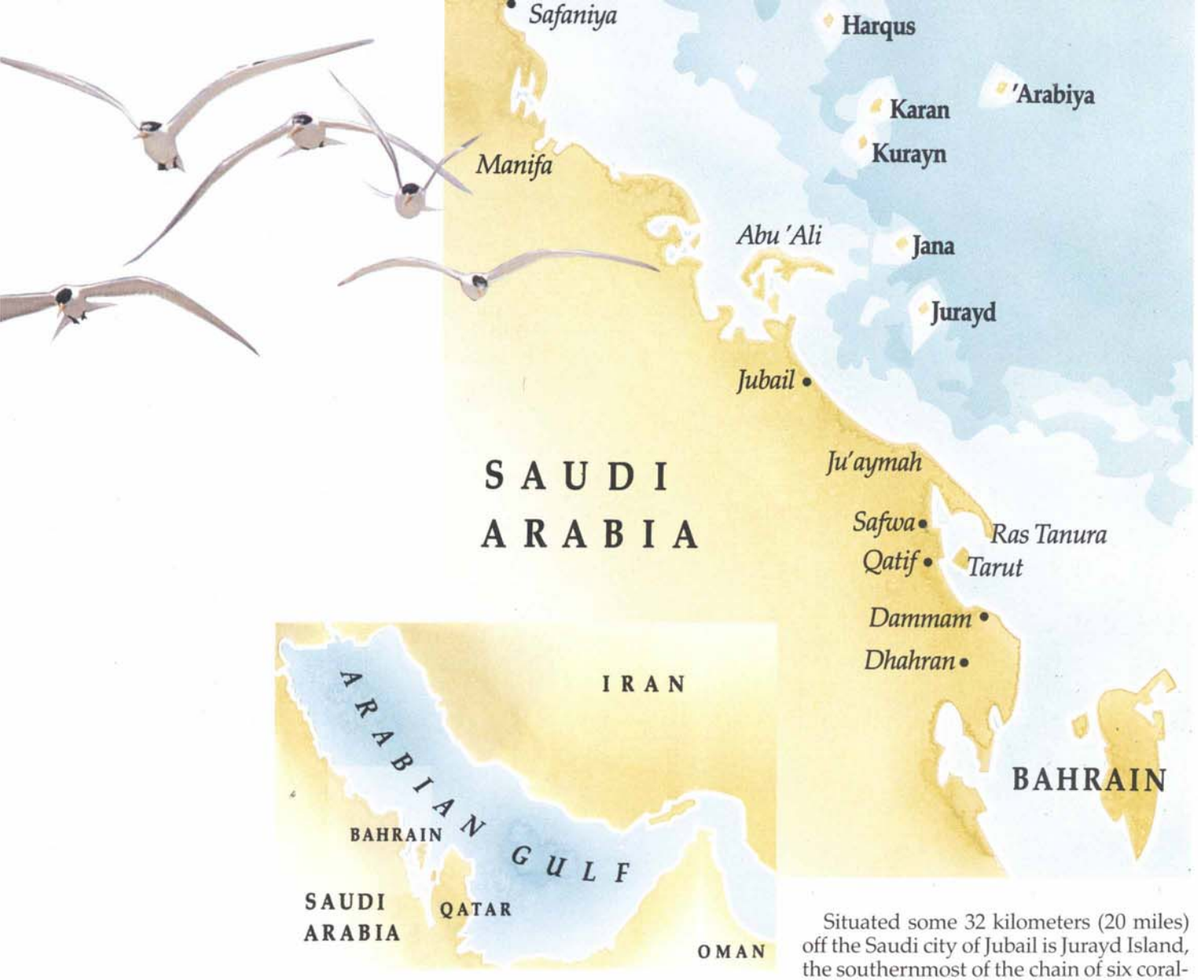
WRITTEN BY AMANDA SPAKE
PHOTOGRAPHED BY TOM WOLFF

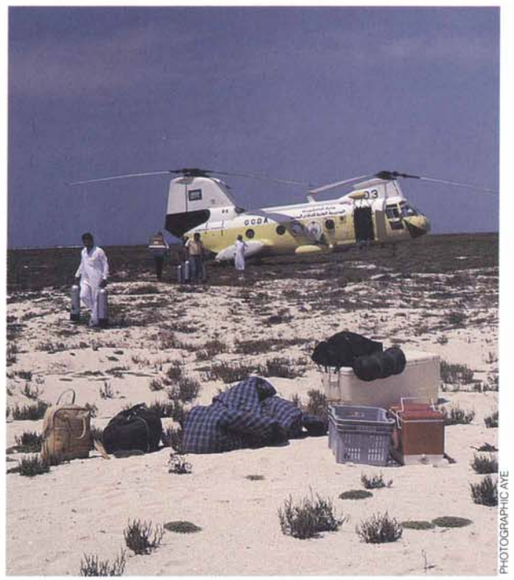
ADAPTED FROM AN ARTICLE IN *THE WASHINGTON POST MAGAZINE*

WRITTEN AND PHOTOGRAPHED BY BROCK STANALAND

The extensive oil spill that occurred in the last days of the war in the Arabian Gulf, early this year, may threaten the survival of wildlife on six unique, tiny islands off the east coast of Saudi Arabia. Even in normal circumstances, life on these islands is a tightrope act, existing at the limits of tolerance of temperature, salinity and other factors. Any environmental degradation could add a fatal additional stress. At press time, the fate of the islands and the creatures that inhabit them remains unknown. Here is a close-up look at what is at stake....

IN HARM'S WAY





PHOTOGRAPHIC AYE

Previous page, Kurayn Island, favored nesting site of Socotra cormorants; lower inset, swift and lesser crested terns nest together; upper inset, a threatened hawksbill turtle. Above left, a squadron of terns takes to the air. Left, Saudi government naturalists land on Karan Island before the oil spill.

Situated some 32 kilometers (20 miles) off the Saudi city of Jubail is Jurayd Island, the southernmost of the chain of six coral-reef islands that exist here where coral islands should not exist. They support a unique ecosystem despite physical and chemical conditions that are normally considered to be too harsh to permit the varied interdependent life forms that have developed on them over the ages.

The Arabian Gulf is a narrow, shallow body of water. No rivers flow into it from the Saudi side; its single significant water exchange is with the Indian Ocean, and – estimates vary – it takes somewhere between 14 and 200 years for its entire volume to be replaced by intake and outflow through the Strait of Hormuz. Because of these characteristics and the severe climate, the marine environment of the Gulf is correspondingly severe. Water salinity and temperatures, greatly affected by meteorological conditions, are as extreme and changeable as anywhere in the world. Saudi coastal water temperatures range seasonally between 10 and 35 degrees centigrade (50 and 95°F). Salinity fluctuates seasonally at all Gulf locations, ranging between 38 and 70 parts per thousand (ppt) along the Saudi coast – up to double the 35-ppt salinity of "normal" open-ocean water.

Widely varying temperatures, and salinity that is excessive even by a few parts per thousand, create stressful conditions for most marine organisms, and the Arabian Gulf environment has thus usually been considered too harsh to support more than a minimal marine community, made up of a handful of particularly resistant species. At most localities near the coast, this is in fact the case – but not on the islands.

The Gulf islands are far enough offshore to be surrounded by relatively deep water and washed by constant currents. These two factors slightly reduce the large fluctuations of temperature and salinity that occur in the very shallow, near-stagnant coastal waters. The resulting conditions – temperatures between 15 and 33 degrees centigrade (59 and 93°F) and salinity ranging from 38 to 42 ppt – are still inhospitable to most organisms, but they are constant enough that an ecosystem has developed that far outstrips those of the mainland shores in complexity.

The six islands, south to north, are Jurayd, Jana, Kurayn, Karan, 'Arabiya and Harqus. Karan is the largest, at 1.3 square kilometers (half a square mile, or 320 acres) and Harqus the smallest at 0.2 square kilometer (less than 50 acres). Harqus, in fact, is so small and low that severe storms occasionally produce waves high enough to wash over it – and it is thus also the only island completely devoid of vegetation. All of the islands support slightly different biological assemblages, but all, even intermittent Harqus, have many physical features in common.

All the islands are coral-reef islands, formed when sand, produced by wave action and other factors, builds up on a submerged coral reef and finally breaks through the water's surface. Each island continues to grow as more sand accumulates, then a plant community gradually develops, and some permanency is achieved as sand is gradually cemented into intertidal beach rock. Harqus is the least developed of the islands.

The birds are the most prominent island inhabitants, especially to casual visitors. Winter and spring bring many species across the Arabian Peninsula on annual migrations between Europe or Asia and Africa (See *Aramco World*, November-December 1986), and the Saudi Gulf islands accommodate their share of these transients. On any given day during the peak of the migrations, a bird watcher there can never be sure what species he might see. More significant to island ecology, however, are the birds that rely on these islands for their existence, the birds that nest there.

Nesting seasons on the islands vary somewhat according to weather and food availability. Depending upon the bird species, however, they generally run from late winter to late summer. During this period, huge numbers of birds inhabit the islands.

The Socotra cormorants (*Phalacrocorax nigrogularis*) are the first nest-builders to arrive; they usually form only one modest colony of several hundred birds on Kurayn. They arrive during the cold of winter and, to create nests, scoop out depressions in the sand that are sometimes surrounded with small pebbles cemented into quasi-permanence by deposits of excreta. Several large, chalky blue eggs are laid in each nest, and incubation and the rearing of the young may continue for many months. Unfortunately, the cormorants bring with them hordes of parasitic mites which infest the nesting area during their stay – and will also infest the unwary photographer who ventures too close.

Four species of tern commonly nest on the islands: swift terns (*Sterna bergii*), lesser crested terns (*Sterna bengalensis*), bridled terns (*Sterna anaethetus*) and white-cheeked terns (*Sterna repressa*). The species normally arrive at the islands at slightly different times in the spring and early summer and tend to form separate nesting colonies, since each species favors slightly different areas of the islands (See *Aramco World*, September-October 1980). Occasionally the colonies are immediately adjacent to one another, and it is not too unusual for swift terns and lesser crested terns to intermingle, if preferred nesting areas are occupied.

A lesser crested tern, above, offers a fish to its chick on Karan Island. Below, two Socotra cormorants, members of the modest nesting colony on Kurayn Island.

The rest of the islands' wildlife is nocturnal, a way of life that brings several benefits. It permits creatures to escape the harsh sunlight and temperatures typical of the Saudi day, and it curbs predation to some extent by hiding animals from their enemies under the cloak of night. Unfortunately for human observers, it also means that the animals must be observed after nightfall, at the end of what is usually a long and trying day of getting to the islands and setting up a campsite.

A female green turtle, below, sprays sand as she digs her nesting pit. Eggs laid, she covers the pit and returns to the water before sunrise.

Seasonally, the islands undergo population explosions of their largest warm-blooded animal, the common house mouse (*Mus musculus*.) Mice were probably introduced to the islands as stowaways from passing boats, since sailors aboard local dhows occasionally stop at the islands to light a campfire and cook. Normally sparse food supplies ashore limit the mouse populations through most of the year, until spring – and the birds – arrive. Then, the abundance of eggs and chicks provides windfall food supplies of which the mice take full advantage. Though they are unable or unwilling to break eggs or kill chicks themselves, the raucous behavior of nesting birds provides sufficient cracked eggs and dead chicks for a veritable feast. The result is increased survival of young mice, and an upswing in their numbers.

The diminutive house mouse plays a key role on the islands as omnivorous clean-up crew. Here, one works on the remains of a human meal.

In addition to consuming eggs and chicks, the mice roam the entire island and eat whatever animal or vegetable material they can find that will sustain them. Visitors who moor boats by tossing an anchor into the low vegetation at the top of the beach are apt to find their craft seething with hungry mice when they return to it. Summer campers on the island often become very aware of the mice during the nights, when their campsites are overrun with furry visitors searching for groceries.

In normal times, early summer signals the onset of sea-turtle nesting. Adult hawksbills (*Eretmochelys imbricata*) – endangered by demand for tortoiseshell made from their beautiful carapaces – are the first to appear, gathering around the islands in late spring to begin mating activities. By mid-May the females begin crawling ashore at night to deposit eggs in large pits they dig on the upper beach – the only reason sea turtles, true deep-water creatures, ever come ashore. Within a month after the first hawksbills appear, the larger green turtles (*Chelonia mydas*) show up. They too are endangered, over-exploited worldwide for their meat, hides and eggs. From skeletal remains found, it is suspected – but not verified – that loggerhead turtles (*Carreta carreta*) also occasionally nest on the islands. Mating and nesting continue for most of the summer.

By September, turtles begin leaving island waters. The only traces they leave behind are their large nest pits on the beaches and the nightly hatching of their young, with their dramatic and dangerous trek across the beach to the water where they will spend their lives. To a limited extent, sea turtles also nest on the Saudi mainland, but predation and increasing competition for habitat have driven most turtles off mainland beaches. Well in excess of 90 percent of the Saudi sea-turtle population nests on the islands, and of the six, Karan is the favored nesting ground for these endangered animals.

A rock crab, the dominant predator of the islands' rocky beaches, dines on a mouse, left. A land hermit crab, above right, has taken up residence in a bottle cap tossed from a passing tanker.

Intertidally – that is, in shore areas between the low- and high-tide marks – the beaches support the largest and most diverse permanent community of animals on the islands. But though sandy beaches surround most of every island, they are not where the majority of animal life is found: Rocky intertidal areas are. There are no large animals permanently residing here, but some of the small ones are spectacular in their ecological roles.

Ghost crabs (*Ocypode saratan*) are fast, agile predators that favor the sand beach, but cover most of the island in their quest for food. They prowl much the same areas as the mice, but are much bolder and more aggressive, and tend to ignore vegetable matter in favor of live prey, which they capture with their speed and their powerful pincers. All other small animals on the island serve as food for the ghost crabs. They often construct conical mounds of sand at the entrances of the burrows in which they spend the daylight hours; counting the mounds thus gives a daytime clue to their population density.

Another animal at home on all areas of the island beach is the land hermit crab (*Coenobita* sp.). Though they prefer rockier beach and tend not to venture as far inland as mice and ghost crabs, hermit crabs are found on all types of beaches. These small crabs usually tuck their vulnerable rear ends into the shell of some dead gastropod, or snail, but they can use any available item with a suitably-sized hole as a residence – including bottle tops discarded from passing tankers. They eat both plants and animals but have very limited ability to catch and overpower prey.

A ghost crab dines on a hatchling turtle, above. These bold, swift predators prefer the beaches, but they prowl island-wide in search of live prey.

The rocky beaches have one undisputedly dominant animal, the predatory rock crab (*Eriphia sebana smithii*). Cryptic coloration, inconspicuous shape and power – not speed and agility – allow this crab to dominate the rocks at night. Its hunting technique is the ambush: It hides motionless and strikes unwary passers-by with strong crushing claws. Rock crabs can catch and subdue any member of the island community, and no creature – including other rock crabs – is safe from their attack.

Perhaps the most spectacular-looking rock dweller is the sally-lightfoot crab (*Grapsus tenuicrustatus*). Large and often gaudily colored, these agile crabs scuttle

Hermaphroditic sea slugs mating, right. A lung-like cavity allows these shell-less snails to remain out of water for long periods.

Male and female blenny resting on rocks, above. By keeping their gills wet, these fish can forage on land after dark. At right, a turtle hatchling.

ROGER FARISH

sidewise over the rocks. Opportunistic feeders, they are usually seen picking through the algae growing on the rocks, but they will eat a wide variety of food. Adult males are easily differentiated from females by their larger, showier claws.

Shell-less snails are the most frequently encountered of the marine grazing community that depends on algae growing on the rocks for its sustenance. These creatures are sea slugs (*Onchidium peronii*). They can remain out of the water for extended periods thanks to a modified mantle cavity that acts as a lung. Far from eye-catching in color or shape, these cryptic slugs are often discovered only when the unwary explorer steps on one. Their unassuming appearance, however, belies their complexity, for these slugs are hermaphrodites, with male and female organs in the same body.

Self-impregnation is not advantageous, however, so sea-slug reproduction is a somewhat complicated process, accomplished by mutual hypodermic impregnation with a calcareous spike. In the mating ritual, one slug pursues and overtakes another; the two then circle each other, rear up over each other's back, and lunge with their spikes; they thus simulataneously impregnate their partners and are impregnated.

Perhaps the most surprising animal found on the beach rock, however, is a fish of the blenny family, *Istiblennius lineatus*. Fish are not normally intertidal animals, but these fish can retain water in their bodies, which keeps their gills wet and makes brief land excursions possible. The blenny squirms its way onto the rocks at night to graze on the algae growing there, sometimes several meters from the water. Nocturnal, dry-land foraging allows the blenny to avoid wave surges and the high visibility of daylight that would make him easy prey for some predators.

The Arabian Gulf islands provide numerous subjects for observation and study. The animal community they support changes from day to night, full moon to new moon, season to season and year to year. The ecological parameters that allow the creatures to dwell on the islands are often near the animals' tolerance limits, and slight changes in conditions might produce sweeping changes in island ecology. For areas of such restricted size, the coral islands of Saudi Arabia play a large and important role in the overall ecosystem of the Arabian Gulf.

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