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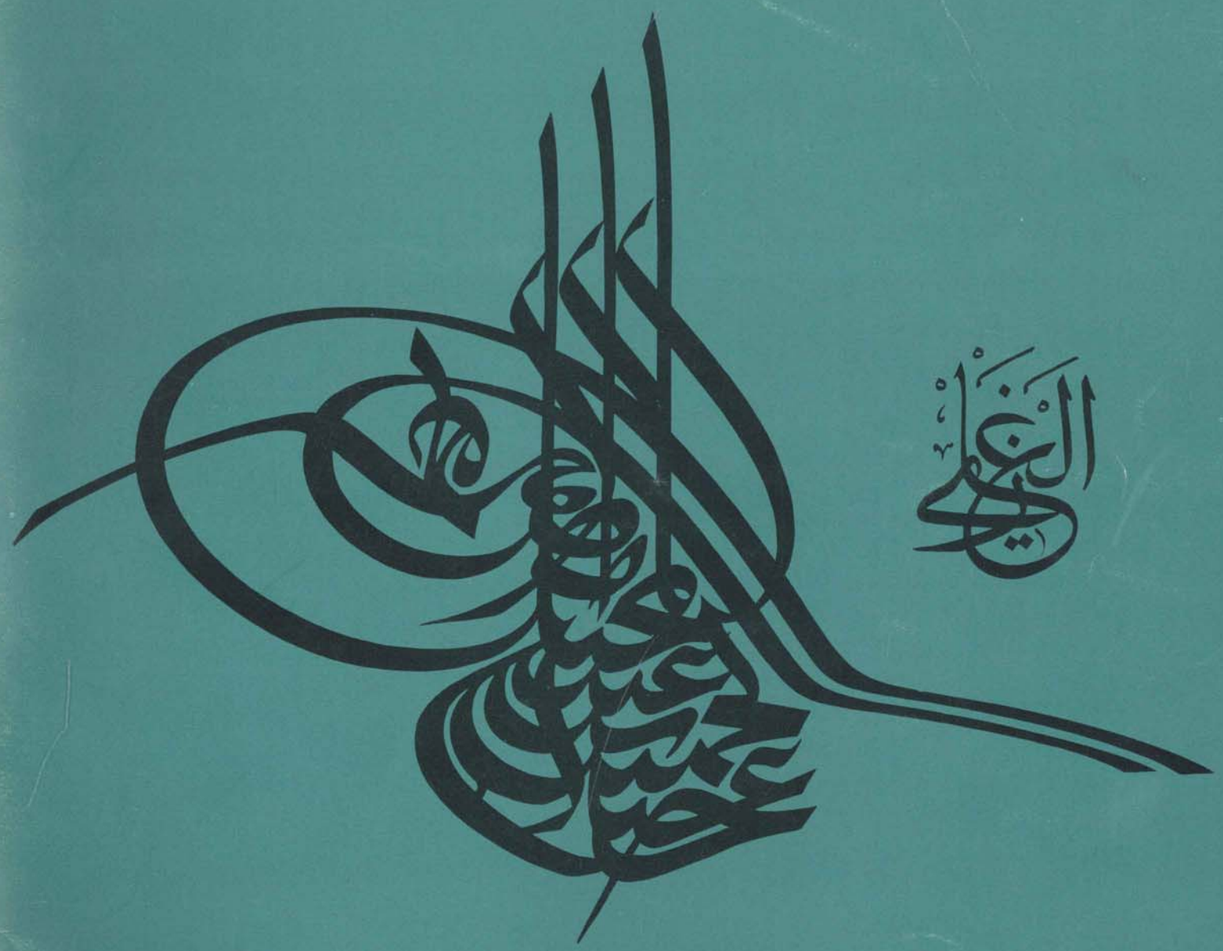

CALLIGRAPHY: A Noble Art

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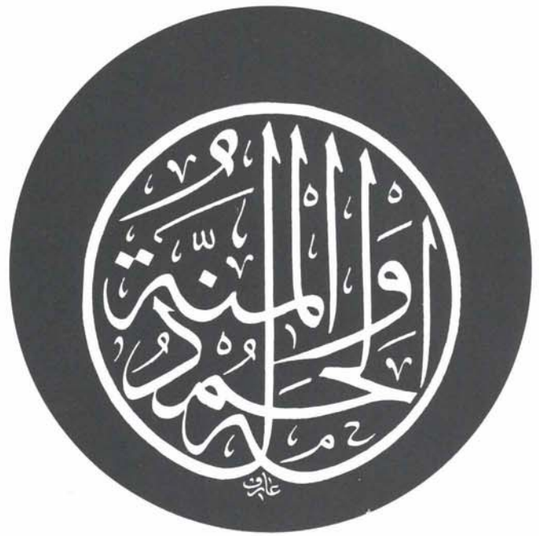
Cover: There are few finer examples of calligraphy than the 17th-century imperial insignia executed by court calligraphers for the rulers of the Ottoman Empire. Pictured is the insignia of Sultan Abdul Hamid who reigned from 1876 to 1909. Done in thuluth script it reads: "Sultan Abdul Hamid, son of Abdul Majid, son of Mustafa." The smaller inscription reads, "Al-Ghazi," or "He who wages war against the infidels."



CALLIGRAPHY: a noble art

BY KAMEL AL-BABA

In thuluth script one calligrapher grouped his words in the shape of an apple to say: "To Him praise and thanksgiving."

TO THE ARAB WORLD CALLIGRAPHY IS MORE THAN HANDWRITING. IT IS A "SPIRITUAL TECHNIQUE" THAT REACHES OUT WITH GRACE AND ELEGANCE TO ENGAGE THE EYE, MIND AND SOUL...

In kufic script shaped like a mosque and four minarets an artist wrote: "There is no strength and no power but that of the Almighty and All-powerful God."

In a broad sense, calligraphy is merely handwriting, a means of recording and transmitting information, sometimes clearly, sometimes not, but in most instances hastily and with little regard for its appearance. In the Arab world calligraphy is something more. It is an art —indeed the chief form of visual art—with a history, a gallery of great masters and hallowed traditions. It is an art of grace and elegance which inspires wonderment for its appearance alone.

What distinguishes calligraphy from ordinary handwriting is, quite simply, beauty. Handwriting may express ideas, even great ideas, but to the Arab it must express, too, the richer dimension of aesthetics. Calligraphy to the Arab is, as the Alexandrian philosopher Euclid expressed it, "a spiritual technique," flowing quite naturally from the influence of Islam.

For thirteen centuries the dominant influence in the Arab world has been the Islamic religion. Its sacred book, the Holy Koran, as the word of God revealed to Muhammad in the Arabic tongue, has inspired generations of calligraphers who have sought to reproduce its words with a perfection of style worthy of its contents. Islam has exerted also a more subtle, a more indirect influence on the development of calligraphy: by discouraging the graphic representation of human beings and animals it channeled the creative energies of Muslim artists toward other decorative arts, especially calligraphy. Because the Koran itself has always been the most widely owned and widely read book in the Muslim world, the incentive to produce beautiful transcripts of the work has been powerful and constant. And because the final product was portable and relatively durable, the art acquired status among a people with nomadic origins.

Historians disagree on both the birthplace and the birth date of Arabic writing, but the most widely accepted theory is that it developed from Nabataean, one of the many west Aramaic dialects which served as the international language of the Middle East from about the 4th century B.C. until the 7th century A.D. In that period, however, the vigorous tide of Muslim expansion flooded the Middle East, and the Arabic of the Arabian Peninsula quickly supplanted Aramaic as the *lingua franca* of the area. So thorough was the Arab conquest of the vast Nabataean empire that today only the "rose-red city" of Petra remains, the silent tomb of a city in the Jordanian desert.

Of the two styles of Nabataean script—Early and Late—the Early style is characterized by its angularity and straight strokes; it is the precursor of *kufic* script. The Late style developed from commercial need. The Nabataean nation, astride the crossroads of the Orient, required a fast, flowing writing style to record its transactions, and the smooth and cursive *naskhi* was the natural result. The *kufic* and *naskhi* styles were the first to be used by the ancient Arabs. For inscriptions on stones, *kufic* script proved to be at once the easiest to incise and the most majestic in appearance. The impressive style was carried over to record sacred works on parchment.

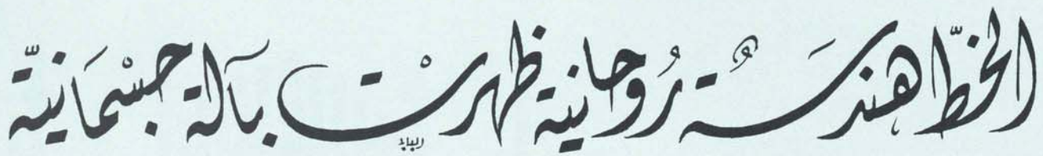
As the oldest Arabic script, *kufic* was used during the early Islamic period for copying the Koran. But the Prophet Muhammad's scribes themselves favored *naskhi* when they wrote letters and other everyday communications. One of the scribes, a Companion of the Prophet, named Zaid ibn Thabit, who wrote down the first complete version of the Koran, assisted by three members of Muhammad's tribe, produced another in *naskhi* during the Caliphate of 'Uthman. The latter version superseded, throughout Islam, all earlier transcriptions, which were ordered burned. The revision of 'Uthman, the only standard text of the Koran up to the present day, was immediately copied and distributed in the Arab centers of Mecca, Damascus, Basra, Kufa and Yemen, where regional variations in script in time evolved into other styles.

During the Umayyad era (661-750) of Damascus, shortly after the death of the Prophet, Arabic calligraphy flourished. Late in the Umayyad period the celebrated *Katabah*—the Scribes—began the modification of *kufic* script, which became the form employed today in calligraphic decorations. The *Katabah* are also credited with the invention of *thuluth* script. Another famed penman, Khalid ibn al-Hajjaj, who was well known for his elegant copies of the Koran, wrote the 91st and subsequent *suras* (chapters) of the Koran in letters of gold in the prayer niche of the Prophet's Mosque in Medina. Unfortunately, this work flaked off bit by bit through the centuries, until today there is nothing left.

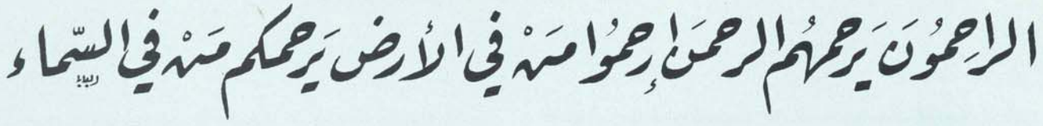
In the 'Abbasid era, which followed the Umayyad dynasty, Vizier Abu 'Ali ibn Muqlah (d. 940) achieved great renown by completing the development of *kufic* from its ancient forms into modern forms, and his elegant new style was copied throughout Islam. After Ibn Muqlah, leadership in the art of calligraphy passed to 'Ali ibn Hilal, better known as Ibn al-Bawwab ("Son of the Doorman") (d. 1022), who perfected the rules of penmanship and conceived a number of variations of *thuluth* script. Most calligraphers who followed him carried on his concept of design until the Caliphate fell to the Ottoman Turks and Arab creativity declined in the East.

Three types of contemporary script are thus wholly of Arab origin: *kufic*, *naskhi* and *thuluth*. Of these the *kufic* style is unquestionably the greatest achievement in Arabic calligraphy. Its beauty and majesty make it ideal for ornamental purposes. With the spread of Arab conquests in the East and West, and the building of new places of worship, palaces and homes, the people felt the need to embellish the structures with ornamental designs. But because Islam discouraged the depiction of the human body, the Arabs turned to other sources of design

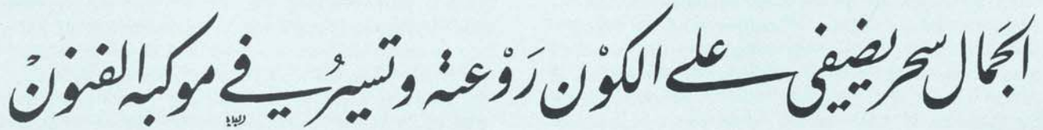
Royal Diwani script: "Beauty is the joy of hearts, the balm of injury, the adornment of life and its elixir."



Diwani script: "Calligraphy is a kind of spiritual technique expressed through a human instrument."



Ruq'ah script: "God have mercy on those who are merciful; if you on earth have mercy, He who is in heaven will have mercy on you.



Farsi script: "Beauty is a spell which casts its splendor upon the universe and the arts march in its caravan."

Latin letters in Gothic script (left) and Arabic characters (right) show a surprising resemblance.

Kufic script: "In the name of God, Most Gracious, Most Merciful."

to decorate their utensils, ceilings and walls. *Kufic* script supplied artists with another medium of expression, which was and is widely used for the decoration of building spandrels and entablatures.

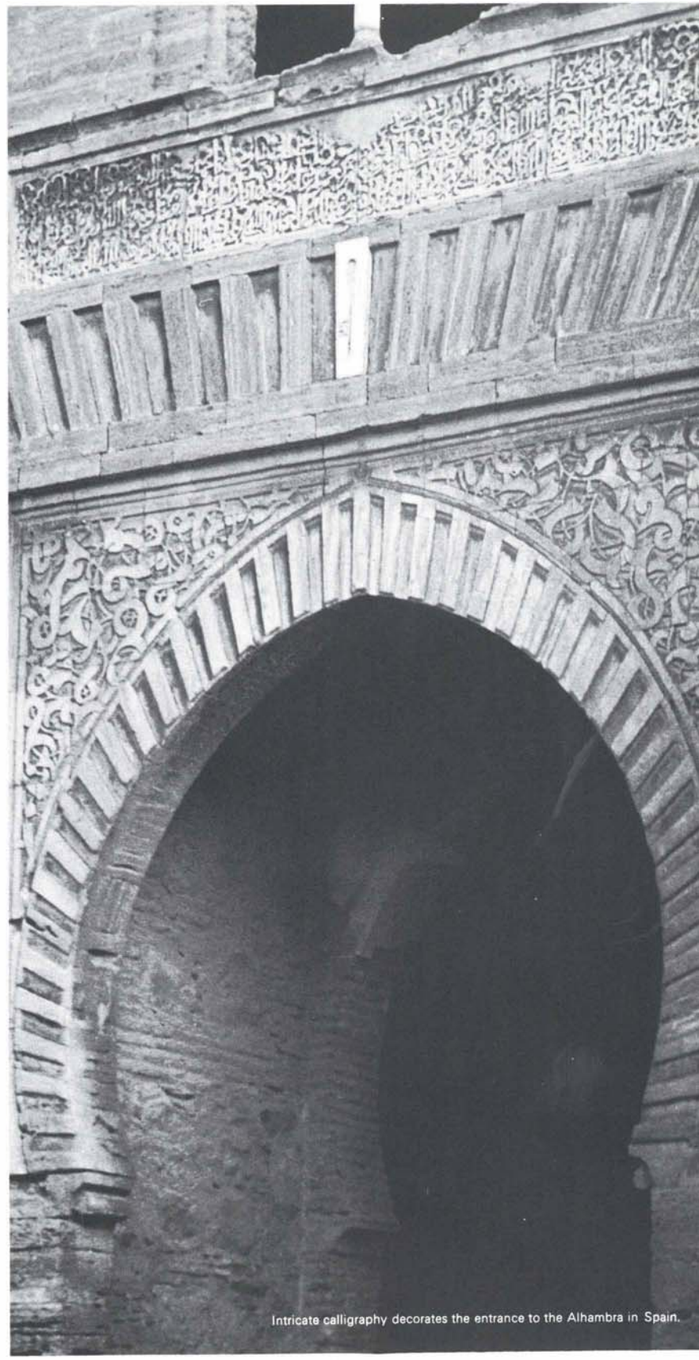
The Arabs of medieval times used interlaced geometric lines derived from the *kufic* style to adorn the walls of palaces and mosques, and the name of this decoration —arabesque—is a constant reminder of its cultural origins. Arabic calligraphy forms a central part of the ornamentation of the Moorish palace of Alhambra, in the province of Granada, Spain. This famous citadel, overlooking the snow-capped Sierra Nevada mountain range, and the Great Mosque of Cordoba, also in southern Spain, are monumental examples of decoration which combine *kufic* and arabesque.

The Moors of Spain enlisted the services of their Christian compatriots to apply arabesque designs. Some of these so-called *dhimmis*, or protégés of Islam, had no knowledge of Arabic and made designs in *kufic* script without the slightest understanding of what they were writing. As a result, some old Andalusian vases exist today with ornamental inscriptions which make no sense whatsoever. The letters were merely strung together by an artist intent on creating something beautiful, rather than meaningful.

It was during the 17th century, under the Ottoman Empire, that Arabic calligraphy attained its highest development. The Ottoman sultans who acceded to the Caliphate showed high regard for their court calligraphers who, among other commissions, executed the royal insignia. Called the "Imperial Monogram," it consisted of tiny, exquisite interlaced writing in the *thuluth* script, denoting the names of the reigning sultan and his father. The monogram was stamped on imperial orders and royal decrees, and appeared on coins of the realm in the same way that, elsewhere, a monarch's likeness is used. Similar monograms are still in use in Iran today by ordinary citizens.

Two great 17th-century Turkish artists—al-Hafiz Osman and Mustafa Rakim—are especially worthy of mention. Osman received fame for his *naskhi* writings and for the many copies of the Koran which he penned in ink and gilt. Mustafa Rakim rebelled against the lifeless conventionalism which characterized much Arabic calligraphy up to his time. He was always seeking ways to bring a more dynamic beauty to the art, even to the extent of sometimes drawing his characters to resemble the form or features of a woman. The suggestion of a tall figure could be seen in his *alif* (ا), the letter in Arabic which corresponds to the letter "A" in the Roman alphabet. His *'ain* (ع) was often drawn to resemble a provocative arched eyebrow.

Happily, Rakim was able to enjoy the appreciation and admiration of his contemporaries. It is on record that Sultan Mahmud II used to stand before him, as a pupil before his teacher, holding his inkstand while the master drew. It is not surprising that the sultan should show such



Intricate calligraphy decorates the entrance to the Alhambra in Spain.

In 19th-century "double script," in which each half of the design is a mirror of the other, is the message: "Say: each man is his own example; your God knows who of you walks most straight on the path of righteousness."

admiration, for he himself was a noted penman—an expert who recognized expert performance.

The Ottomans, however, were not content merely to improve the types of script which they inherited from the Arabs. They also added to the calligraphers' repertoire the *diwani* script, with its two variants, and the *ruq'ah* script which, because of its stenographic simplicity, is now used by most Arabs for their everyday writing.

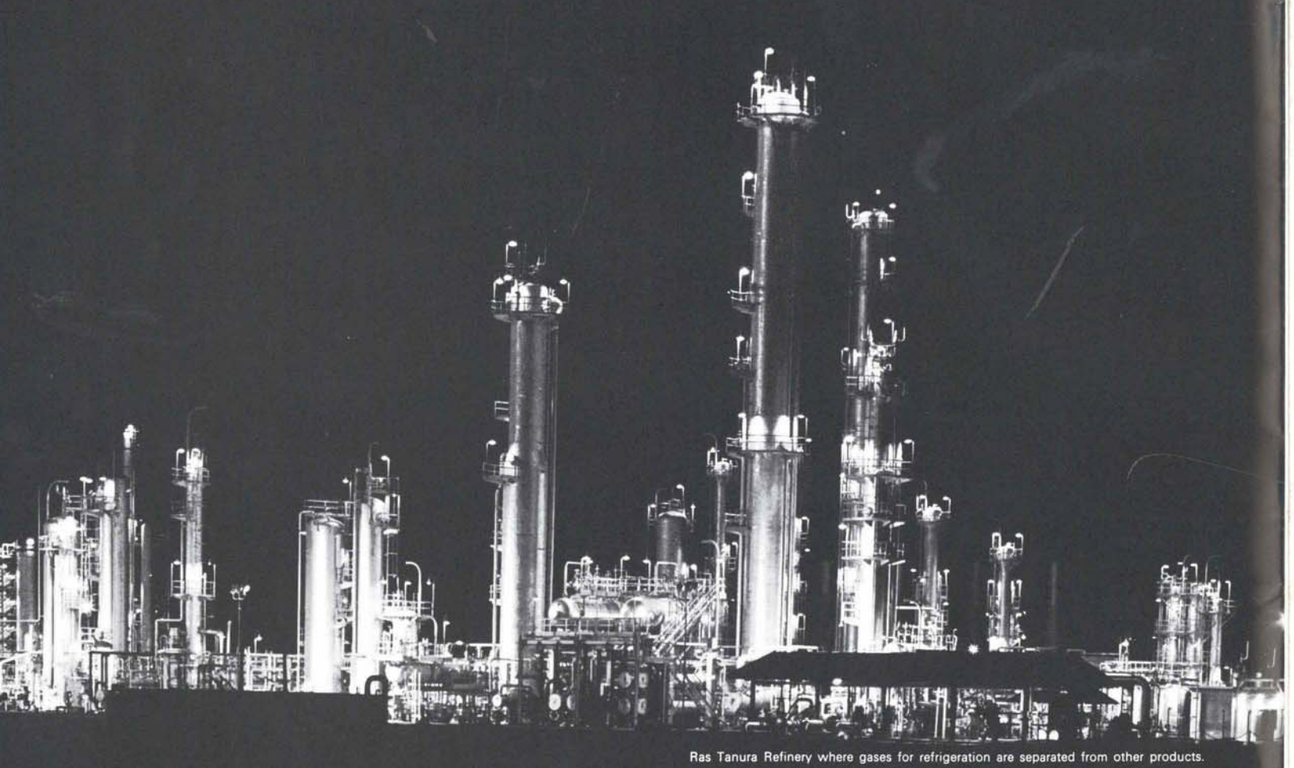
The use of Arabic script continued in Turkey until the last days of its Ottoman rulers, but lost status with the demise of the Empire at the end of World War I. During the presidency of Kemal Atatürk, father of modern Turkey, Arabic characters were replaced by the Roman alphabet, slightly modified, which continues in use today. The magnificent calligraphic legacy of the scribes of former times can still be seen in the mosques, museums and palaces of Istanbul, and even now calligraphers throughout the Middle East regard Istanbul as the spiritual home of their art.

When the great days of Ottoman calligraphy passed, Egypt fell heir to the role of protector and preserver of the art of Arabic writing. In 1921, King Fuad I called the famous Turkish calligrapher, Muhammad 'Abd al-'Aziz ar-Rifa'i to Cairo, where he transcribed the Koran and gilded the result. Soon afterward King Fuad founded a school to pass on the learning and artistry of the finest calligraphers of our time. This school is still in existence.

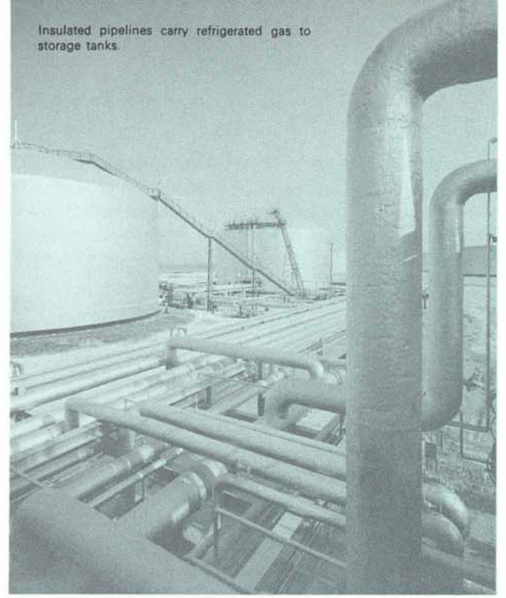
Urdu, Kurdish and Persian are among the languages which still use an Arabic script, even though genetically they are more closely related to English than they are to Arabic. Yet there is little likelihood that these language groups, or the Arabs, will exchange their writing system for the Roman alphabet, though this has often been urged for the sake of uniformity, simplicity and adaptability to printing devices such as typewriters. With four forms possible for each of the 28 letters of the Arabic alphabet, any mechanical means of printing is relatively costly and complicated. But cultural as well as religious pressures argue against the adoption of any such system. Not only is the Holy Koran written with a script which is, for all practical purposes, the same as that used in daily life, but the vast treasury of Arabic poetry, which every Arab reveres, is inseparably associated with the script in which it was originally written. ■

Kamel al-Baba, one of Lebanon's leading professional calligraphers, studied under Najib Hawawini, former calligrapher to the Royal Court of Egypt. Mr. al-Baba lives and works in Beirut.

An illuminated page done by the celebrated calligrapher, Mustafa Izzet, in 1873, describing the moral qualities of the Prophet.



Ras Tanura Refinery where gases for refrigeration are separated from other products.



Insulated pipelines carry refrigerated gas to storage tanks.

COOL, CONDENSE AND SHIP

A SURPLUS OF GAS WAS AVAILABLE IN SAUDI ARABIA, BUT A FEASIBLE METHOD OF TRANSPORTATION WAS NOT ... BY HOMER DIXON

In a small home on the Japanese island of Shikoku not long ago, Noriko Ieda, a housewife, turned on a gas jet, touched a match to it and began to prepare the evening meal for her family.

It was, on the surface, a most unremarkable scene, one common to households around the world. Yet to Noriko Ieda and to a group of engineers thousands of miles away, the scene had a particular significance. To Noriko Ieda it meant the end of a bothersome chore — cooking meals over a slow, charcoal-fueled *habachi* burner. To the engineers it meant the successful completion of more than ten years of expensive, complicated research on a process that today links the rich deposits of gas in Saudi Arabia's oil fields with the kitchens and factories of Japan: refrigeration of liquefied petroleum gas (LP Gas).

In most advanced regions of the world today gas is nearly as common as fresh air. It reaches industry and homes even in the most remote areas and where readily available challenges and has even supplanted coal and wood as basic fuels. Until recently, however, gas was not readily available in many countries. The gap between source and consumer was too large to bridge, or the expense of bridging it too great. Great stretches of land and sea, for example, separate crowded Japan, where a soaring economy has created an urgent demand for industrial and domestic fuels, from Saudi Arabia, where vast supplies of gas are much greater than presently needed there.

The most logical method of transportation was, of course, ships. But ten years ago, when such firms as the Arabian American Oil Company (Aramco) began to concentrate on the problem, there weré serious obstacles to such shipment. In the first place, any container strong enough to hold LP Gas under sufficient pressure to keep it liquid at normal temperatures would be prohibitively expensive. Moreover, the walls of such containers would have to be so thick that ships of enormous size would be required to carry them. Since transporting LP Gas in liquid form at normal temperatures simply did not make economic sense, engineers began to seek another solution. Why not, they asked themselves, *cool* and *condense* the gas into liquid form, keep it refrigerated until it reaches its destination, and then vaporize it there into its original gaseous state?

The advantages of this approach were obvious. A ship carrying 100,000 barrels of gas in its condensed form would actually be carrying 150,000,000 cubic feet of

vapor, enough to supply 350,000,000,000 BTU's (British Thermal Units) of heat, roughly the equivalent of 12,000 tons of coal. In short, shipment of a refrigerated liquid would involve only a fraction of the expenditure required for shipment of LP Gas under high pressure at normal temperatures.

Between the idea and its realization, however, stood formidable barriers. Aramco customers—other oil companies—had to first determine the world market potential. A price structure and tentative product specifications had to be set. Enormous amounts of data on production, processing and transportation had to be compiled and evaluated to determine if ocean shipment of refrigerated gas were economically feasible. Engineers had to develop the various processing methods—and determine their costs—that could be used to produce, according to required standards of purity, finished gas from the raw gas available in Saudi Arabia, and also to evaluate the problems involved in cooling and liquefying the processed gas and in storing and handling it. Owner companies simultaneously had to study the problems of transporting it by ocean-going tankers and of storing it and handling it again in marketing areas.

As the project got under way, engineers decided to concentrate their studies on the butane and propane portions of the available gas because of the problems foreseen if other portions — ethane or methane, for example — were used too. To liquefy petroleum gases for ocean shipment at atmospheric pressure it is necessary to lower their temperatures, and the lighter the gas the colder the temperature must be. Butane, for example, has to be cooled to 31°F., propane to – 44°F., ethane to – 128°F., and methane down to – 259°F. But it happens that the lower the temperatures required to liquefy a given gas, the greater the number of technical problems that must be faced in the cooling and subsequent transportation of that gas by refrigerated ship. Thus, the handling of butane and propane liquefied petroleum gases is relatively easier than, say, that of ethane or methane.

Even with butane and propane, however, the technical problems were still great, problems such as the development of special metals strong enough to stand the stresses of temperatures as low as – 50°F.

Engineers responsible for selecting the steel that would go into the tanks and pipes in which LP Gas would be processed, moved, stored and transported had in mind constantly two events that underlined the importance of their search:

—— On January 16, 1943, the brand-new tanker *Schenectady*, sitting empty in calm water at a Boston dock, suddenly and violently broke in two. Investigators found that the vessel had been constructed of steel of approved quality, had been constructed according to an accepted design and had been competently built. They found too that there were no external factors that could have caused the fracture.

—— On Oct. 20, 1944, in Cleveland, a cylindrical pressure vessel designed to store liquid methane at – 260°F. ruptured. According to the American Society for Testing Material there was a rumble followed by fire and an explosion. Twenty minutes later an adjacent tank failed. Liquid gas flowed into neighborhood sewers, spreading the holocaust which killed 128 people and caused nearly $7,000,000 damage. Investigators found that there had been no initial explosion in the methane tank itself.

Both events highlight what metallurgists call "brittle fracture," the tendency of metal to fail at extremely low temperatures. Studies showed that nearly 300 ships in World War II experienced brittle fracture and that there were numerous instances of metal in ships, storage tanks, pipelines, bridges, stacks and even power shovel booms failing without warning and often without explanation.

Engineers assigned to the LP Gas project knew that brittle fracture at such installations as Aramco's Ras Tanura Refinery or Marine Terminal, where major elements of the new LP Gas plants would be built, could be catastrophic. But they knew too that there were also economic factors to be considered. If, for example, refrigerated tanks and pipelines were built of nickel alloy steel, there would be no question that they would be safe, but the cost would be double. Thus their challenge was to find a metal that would be safe, yet economical.

In beginning their quest the engineers and metallurgists, much like lawyers examining case precedents, studied the histories of such failures as those in Boston and Cleveland. More than 300 such cases were carefully investigated and on the basis of those findings tests were begun on samples of specially-made carbon steel. Studies had disclosed that 15 foot-pounds of energy absorption at the intended service temperature was a reasonable level of safety, but Aramco set 20 foot-pounds as the minimum requirement and began to test the samples against this standard.

One test — called the Charpy V-Notch test — subjected a sample of steel, which had been chilled by dry ice in alcohol to the specified temperature, to a blow from a pendulum at a point where a notch had been made in the metal. This test determines the amount of energy metal will absorb before breaking and discloses the tendency toward behaving in a brittle fashion. Another test was conducted to evaluate the metal's reaction, again at the specified temperature, to the explosive effects of a charge of TNT.

Out of the testing came, eventually, the metal that was needed — a low-carbon, high-manganese steel sufficiently ductile to resist brittle fracture yet economically acceptable for use in the huge quantities needed for the complex of tanks, pipelines, vessels, and heat exchangers envisioned for the Ras Tanura Refinery.

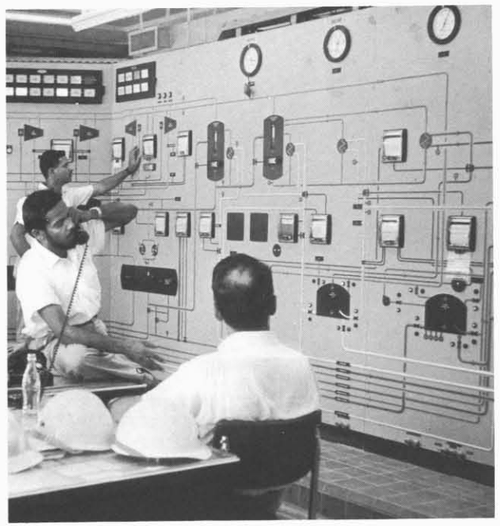
Such pioneering work, along with development of insulation materials, loading methods and designs for the vital special tankers, required hundreds of thousands of hours of study and experiment before construction could even begin. But in 1959, some six years after concentrated work on the project got under way, the decision was made to construct an LP Gas plant in Aramco's Ras Tanura Refinery.

Initial plans called for the installation of facilities at Ras Tanura which could produce about 2,000 barrels a day of butane and 1,500 barrels a day of propane. Those gases, extracted from crude oil, were to be then "dried," to prevent the formation of ice when cooled later, and then pumped some seven miles to the Aramco Marine Terminal area at Ras Tanura where refrigeration equipment and other low temperature facilities were to be located.

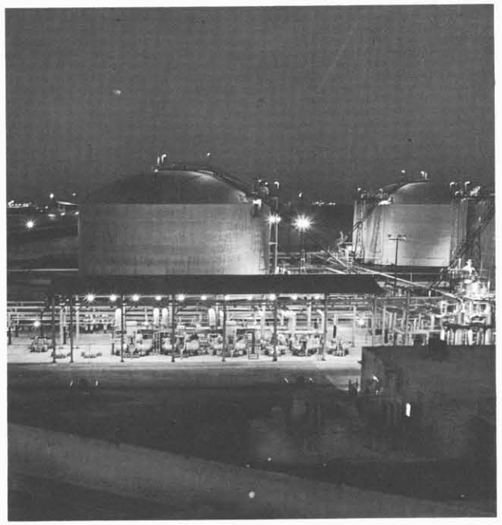
Even as construction got under way problems continued to crop up but for each, regardless of its magnitude, specialists found an answer and the project moved toward completion.

It was realized on December 6, 1961, with the shipment to Japan of 50,000 barrels of butane and propane as refrigerated liquefied petroleum gas, the first large commercial shipment of such gases in this form. On that day the oil industry also chalked up two other "firsts." The new Aramco plant at Ras Tanura's Marine Terminal was the first facility ever designed and constructed specifically to refrigerate propane and butane for shipment by ocean tanker. The Japanese tanker, *Gohshu Maru*, which carried the chilled liquid to Japan, was the first ship ever designed and built for the express purpose of carrying refrigerated LP Gas.

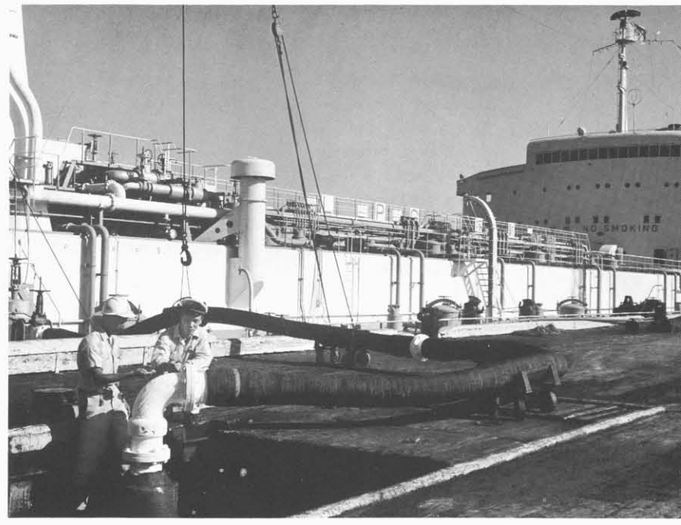
When the new 46,000 deadweight-ton tanker cleared Berth 6 at the terminal's North Pier, she was carrying, in five insulated tanks not unlike giant Thermos bottles, 30,000 barrels of refrigerated propane and 20,000 barrels of refrigerated butane to be consumed in Japan as domestic and industrial fuel, and as a raw material in petrochemical processes.



Control room at Ras Tanura Marine Terminal regulates gas flow to pier.



Domed tanks, in background, store 80,000 barrels of LP Gas each.



Frost on loading line elbow shows the below-zero temperature of gas during handling.

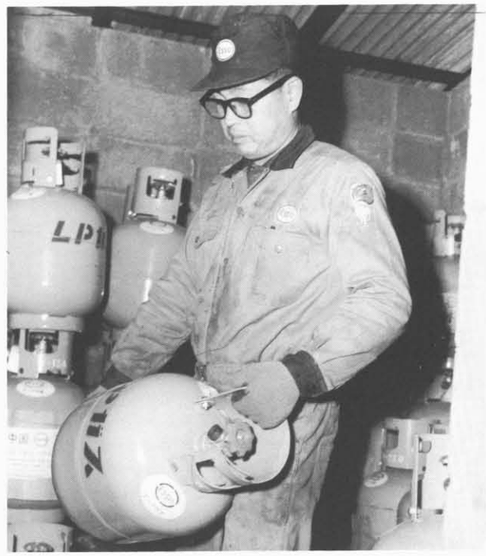
Aramco personnel attach loading arm aboard Japanese tanker

Meanwhile, some two months prior to the first successful shipment, Aramco management had approved a significant expansion of the company's refrigerated LP Gas facilities — from an existing capacity of 3,500 barrels a day of propane and butane to 12,000 barrels.

Because the enlargement would require larger supplies of gas, the company had to go approximately 70 miles inland to the oil-producing center of Abqaiq and there tap the large quantities of raw gas produced in association with crude oil. The raw gas is separated from crude oil and is available for other uses. At Abqaiq, installations were designed which would remove the so-called "heart-cut" (the middle range of a product being distilled) of propane and butane from some of the raw gas and send it via pipeline to Ras Tanura. The installations included two fractionating columns (in which the gases are separated) — one of which is a seven-story-high deethanizer tower (in which ethane and lighter gases are removed) over 11 feet in diameter, with walls about $2\frac{1}{3}$ inches thick and weighing 150 tons.

The lighter and heavier gases, left over after the propane and butane had been extracted, are injected into nearby reservoirs to help maintain underground pressure.

Another expansion project within the Ras Tanura Refinery itself involved the addition of new LP Gas processing plant units. These included treating facilities to remove hydrogen sulfide and mercaptan sulfur, a depropanizer, a 12-story-high deisobutanizer, a debutanizer and new driers.



Japanese worker distributes LP Gas ...

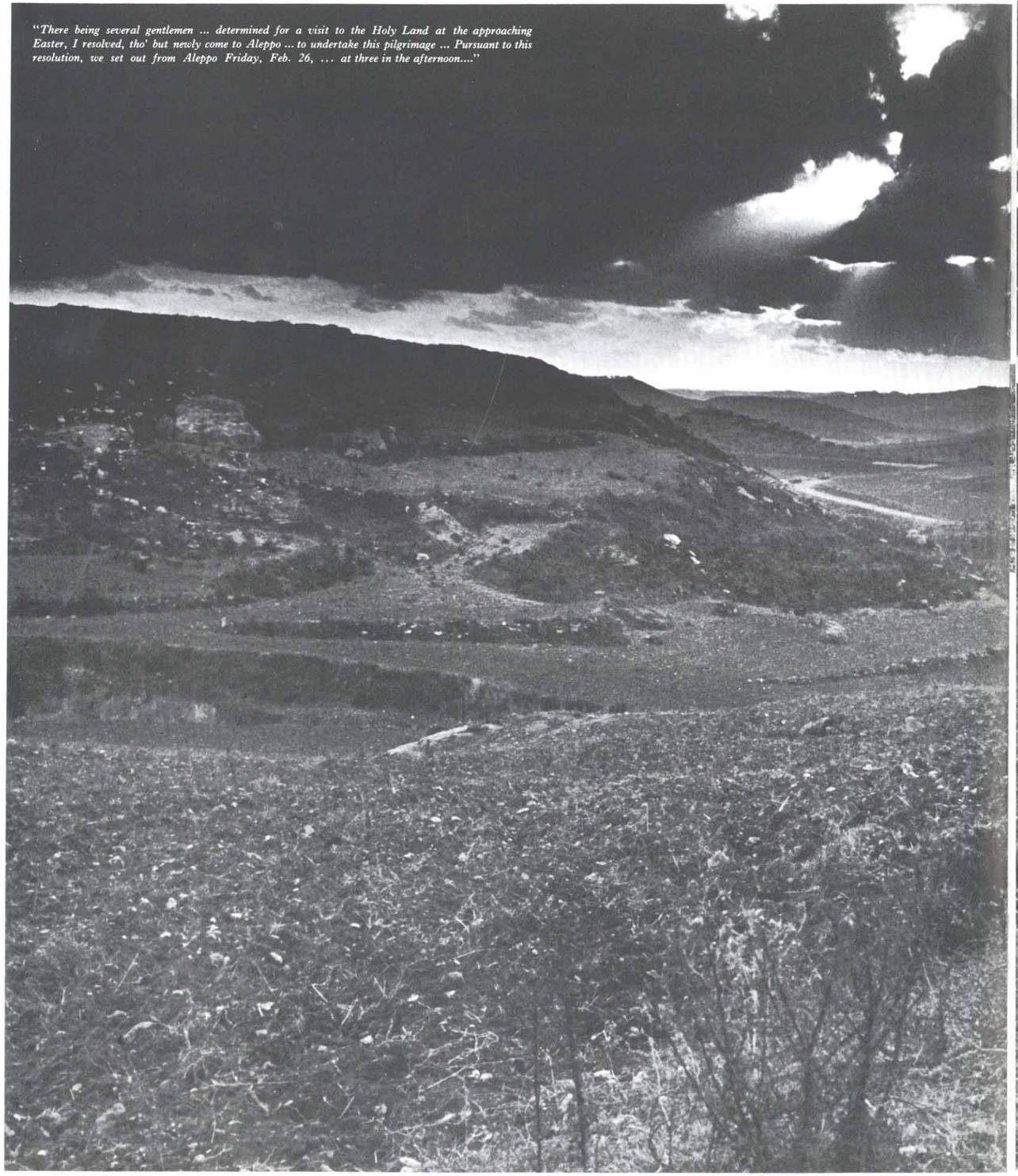
Three new insulated 80,000-barrel tanks were added to three already-existing tanks of the same size at the Ras Tanura Marine Terminal, bringing to six the total number of storage tanks for refrigerated propane and butane there. New refrigeration compressors, heat exchangers, vessels and pumps also were installed.

The cost of such projects, like the cost of development, was, of course, large. By September, 1963, when the expansion at Abqaiq and Ras Tanura was finished, Aramco alone had spent approximately $25,000,000 for its LP Gas facilities in Saudi Arabia.

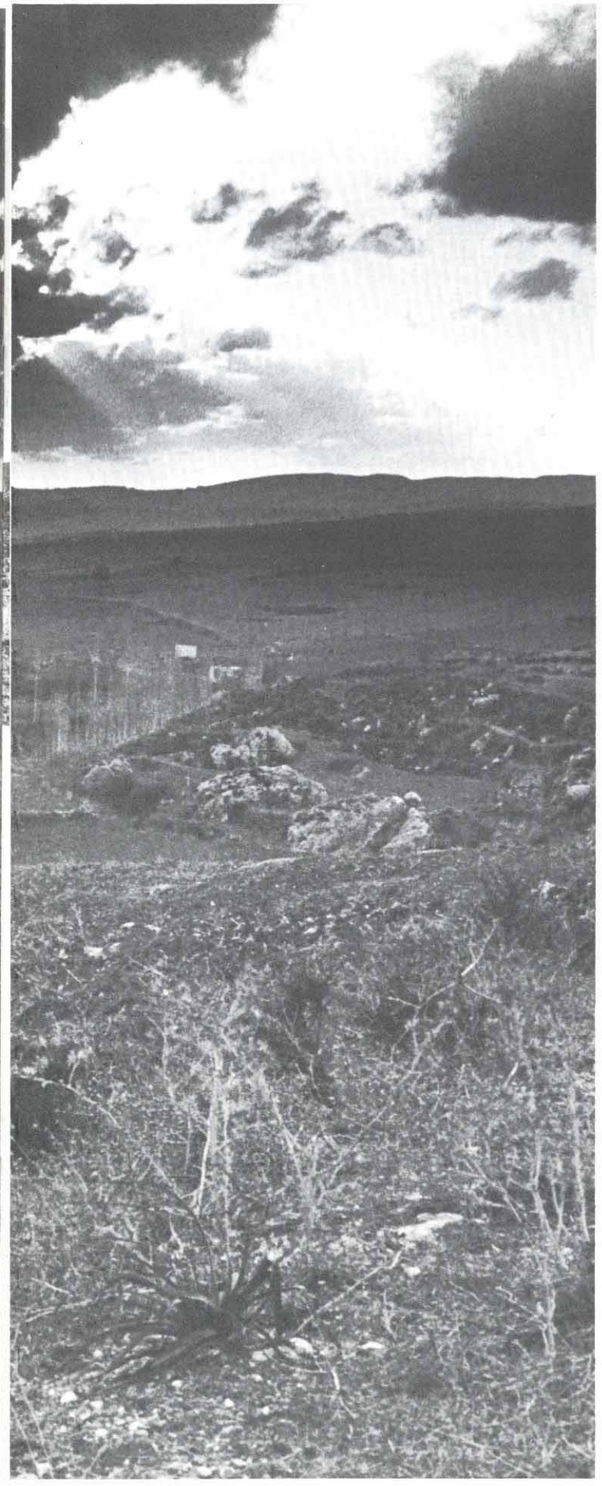
So the basic problem was solved. Special tankers now cross the seas, transporting LP Gas on regular schedules, and in Saudi Arabia planners have already begun estimating the future expansion of the installations that are prepared to supply essential fuel—to Noriko Ieda, Japan, or to peoples elsewhere around the globe. ■

Homer Dixon, a chemical engineer, studied at Yale and at the University of Washington. For the past five years he has lived in The Hague working as a project manager for the Aramco Overseas Company.

for use in fueling automobiles ... or in preparing garden snacks ..



"There being several gentlemen ... determined for a visit to the Holy Land at the approaching Easter, I resolved, tho' but newly come to Aleppo ... to undertake this pilgrimage ... Pursuant to this resolution, we set out from Aleppo Friday, Feb. 26, ... at three in the afternoon...."

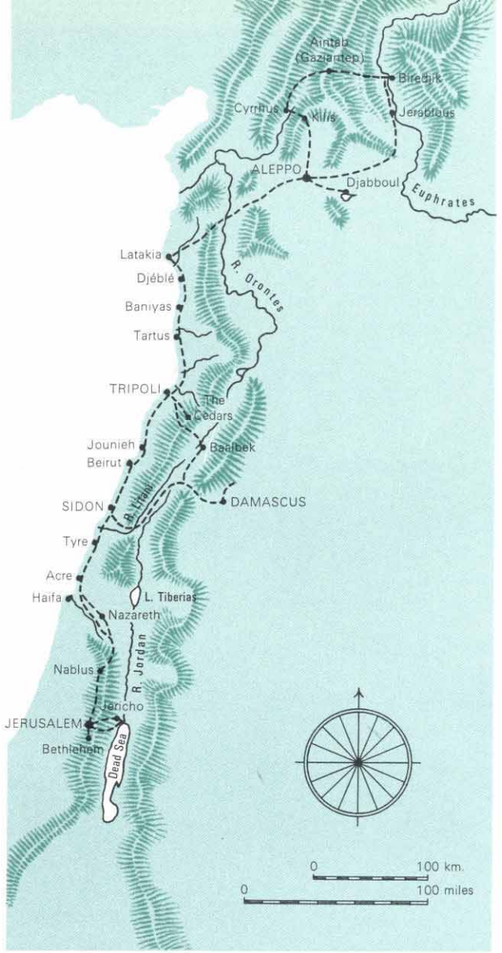


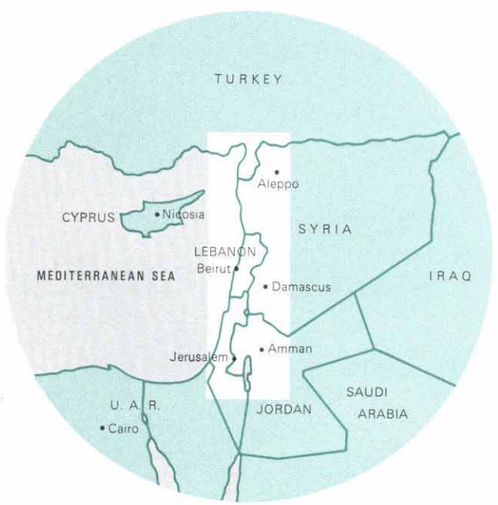
THE JOURNEY OF HENRY MAUNDRELL

FOR MORE THAN TWO AND A HALF CENTURIES A BRIEF ACCOUNT OF A BRIEF TRIP THROUGH THE MIDDLE EAST HAS SURVIVED AS A MINOR TRAVEL CLASSIC ... BY DAVID HOWELL

At precisely three o'clock in the afternoon, on Friday February 26, 1697, the Reverend Henry Maundrell and fourteen companions mounted their horses and rode out of the city of Aleppo to begin what was to be an 83-day Easter pilgrimage to Jerusalem. It was not an exceptional undertaking; agents from the English Levant Company's office in Syria, to which Maundrell was assigned as chaplain, frequently made such trips at that time of year. But this pilgrimage was to be different, for it was to inspire the eventual publication of a small book of lasting importance, a book which today, 267 years later, remains a minor classic in the overcrowded archives of travel writing, *A Journey From*

"The plains of Kefteen are of a vast compass: extending to the southward beyond the reach of the eye ..."





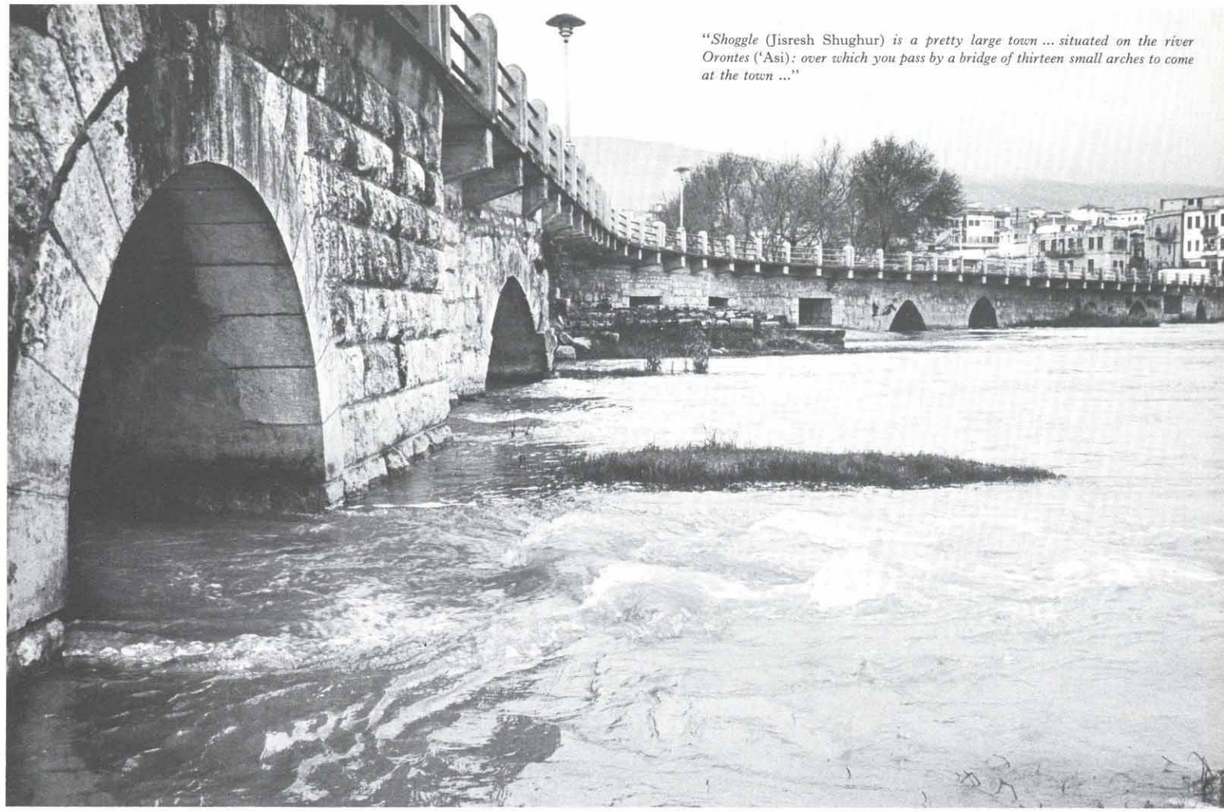
Aleppo to Jerusalem At Easter A.D. 1697.

The book, published and republished over the years and translated into at least three languages, began as merely a diary in which Maundrell recorded his observations as he rode across Syria to Latakia, down the Syrian and Lebanese coasts and inland to Jerusalem and the Holy Land, and then returned to Aleppo, visiting such places as Damascus, Baalbek and Tripoli. Maundrell had intended to circulate it among friends and perhaps win a measure of favor with his clerical superiors.

At that time, however, there was in England a surprising degree of interest in the Middle East and an equivalent lack of accurate information about it. Travelers were by no means rare but their published accounts tended to relate personal adventures or to express reactions and opinions rather than to provide information about what is surely one of the most scenically arresting and historically important regions of the world. Many of the previous travelers had shown a greater gift for poetry than for reporting with the result that the Middle East was seen through an unreal and frequently fanciful haze. Thus when Maundrell's diary, crammed with precise, factual information, began to circulate among his friends they quickly realized that here at last was one of the first factual accounts of the antiquities of the Middle East. Its impact was such that he was persuaded to prepare it for publication.

It is easy today to see just why Maundrell's book has retained a rather surprising measure of popularity during more than two and a half centuries; for Maundrell, unlike most of his contemporaries and indeed unlike many of the more famous travel writers of today, was basically a fine reporter, detached, cool and observant, with a passion for precise detail. As his small party made its way over mountains and plains, through rain and snow, suffering at first from the cold, later from the heat, Maundrell carefully recorded meticulous descriptions of castles, mosques, churches, fortresses, aqueducts, wells, rivers, mountains, plains and trails, each complete with measurements, directions, distances, colors, textures and weights. In describing the remains of an ancient castle in Tartus, for example, he wrote:

"*On one side, it is wash'd by the sea; on the others, it is fortified by a double wall of course marble, built after the rustick manner. Between the two walls is a ditch; as likewise is another encompassing the outermost wall. You enter this fortress on the north side, over an old drawbridge, which lands you in a spacious room, now for the most part uncover'd, but anciently well arch'd over, being the church belonging to the castle. On one side it resembles a church; and in witness of its being such, shews at this day several holy emblems carv'd upon its walls, as that of a dove descending, over the place where stood the altar; and in another place, that of the holy-lamb. But on the side which fronts outward, it has the face of a castle, being built with port-holes for artillery, instead of windows. Round the castle, on the south and east sides, stood anciently*



"*Shoggle* (Jisresh Shughur) *is a pretty large town ... situated on the river Orontes* ('Asi)*: over which you pass by a bridge of thirteen small arches to come at the town ...*"

the city. It had a good wall and ditch encompassing it, of which there are still to be seen considerable remains. But for other buildings, there is nothing now left in it, except a church, which stands about a furlong eastward from the castle. It is one hundred and thirty foot in length, in breadth ninety three, and in height sixty one."

This is the disciplined prose of excellent reporting, free of emotion, free of generalities, yet highly evocative, a quality that is evident on page after page. In commenting on the plains of Kefteen he described them as being of:

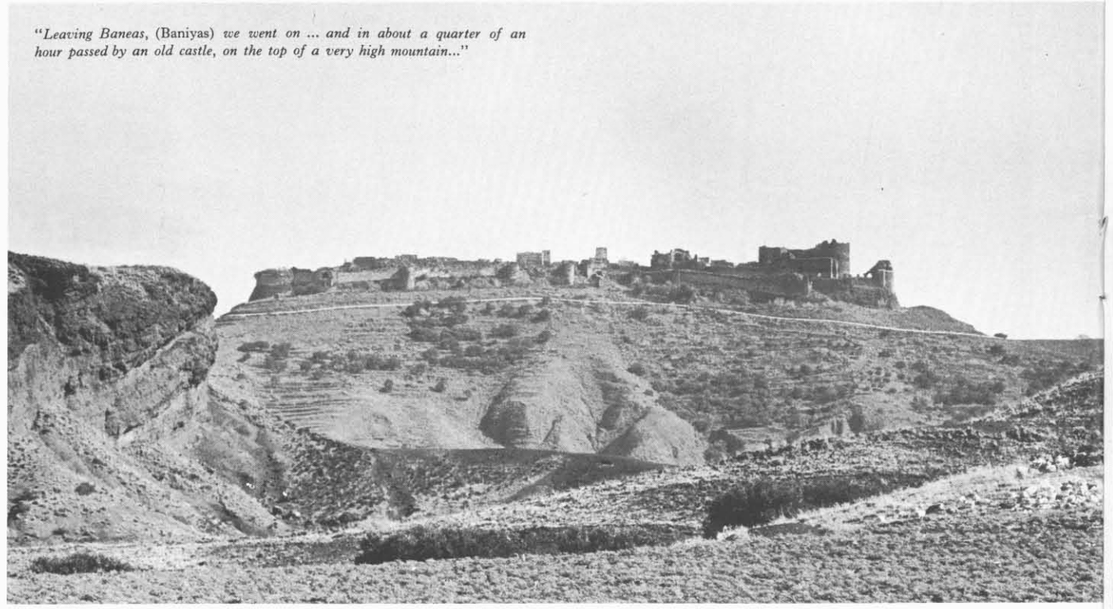
"*...a vast compass: extending to the southward beyond the reach of the eye, and in most places very fruitful and well cultivated. At our first descent into them... we counted twenty-four villages, or places at a distance resembling villages, within our view from one station. The soil is of a reddish colour, very loose and hollow; and you see hardly a stone in it. Whereas on its west side there runs along for many miles together a high ridge of hills, discovering nothing but vast naked rocks, without the least sign of mould, or any useful production: which yields an appearance, as if nature had, as it were, in kindness to the husband-man, purged the whole plain of these stones, and piled them all up together in that one mountain.*"

The quality is evident too in his comments on Damascus. Of the houses there he wrote:

"*Here you find generally a large square court, beautified with variety of fragrant trees, and marble fountains, and compass'd round with splendid apartments and duans* (divans)*. The duans are floor'd and adorn'd on the sides, with variety of marble, mixt in Mosaick knots and mazes. The ceilings and traves* (cross beams) *are, after the Turkish manner, richly painted and guilded. They have generally artificial fountains springing up before them in marble basons; and, as for carpets and cushions, are furnish'd out to the height of luxury.*"

And of the famous Umayyad Mosque:

"*...we had three short views of it, looking in at three several gates. Its gates are vastly large, and cover'd with brass, stampt all over with Arab characters... On the north side of the church is a spacious court, which I could not conjecture to be less than one hundred and fifty yards long, and eighty or one hundred broad. The court is pav'd all*



"Leaving Baneas, (Baniyas) *we went on ... and in about a quarter of an hour passed by an old castle, on the top of a very high mountain..."*

over, and enclosed on the south side by the church, on the other three sides by a double cloister, supported by two rows of granite pillars of the Corinthian order, exceeding lofty and beautiful."

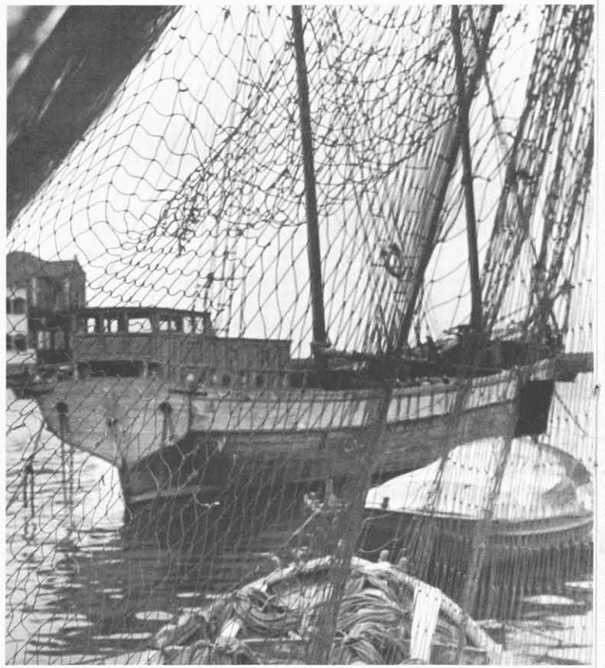
Whether describing a castle near Baniyas as "built in the figure of an equilateral triangle having one of its angles pointing towards the sea," or carefully counting the "thirteen small arches" of the bridge over the Orontes ('Asi) River in Shoggle (Jisresh Shughur), Maundrell never varied from the pattern of precision, as if determined to invest every paragraph with pertinent information. Even in such briefly mentioned sites as that of the gate at which St. Paul was let down in a basket while fleeing Damascus, Maundrell explains that the gate was walled up then, "by reason of its vicinity to the east gate which renders it of little use."

This determination is particularly clear in his comment on the terraced slopes of Lebanon:

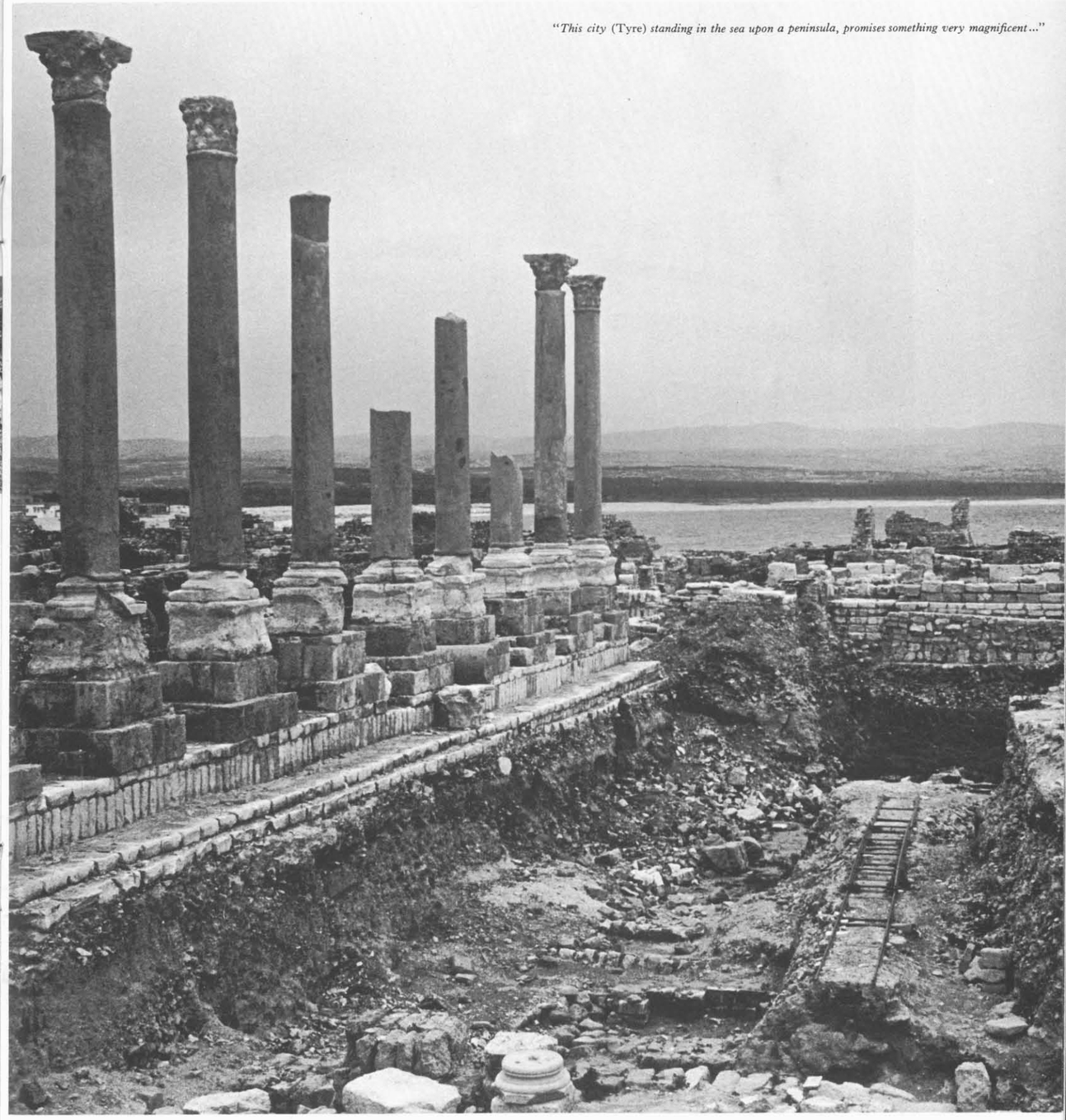
"Libanus is in this part free from rocks, and only rises and falls with small, easy unevennesses, for several hours riding; but is perfectly barren and desolate. The ground, where not conceal'd by the snow, appear'd to be cover'd with a sort of white slates thin and smooth. The chief benefit it serves for, is, that by its exceeding height, it proves a conservatory for abundance of snow, which thawing in the heat of summer, affords supplies of water to the rivers and fountains in the valleys below."

or in his description of the Dead Sea as:

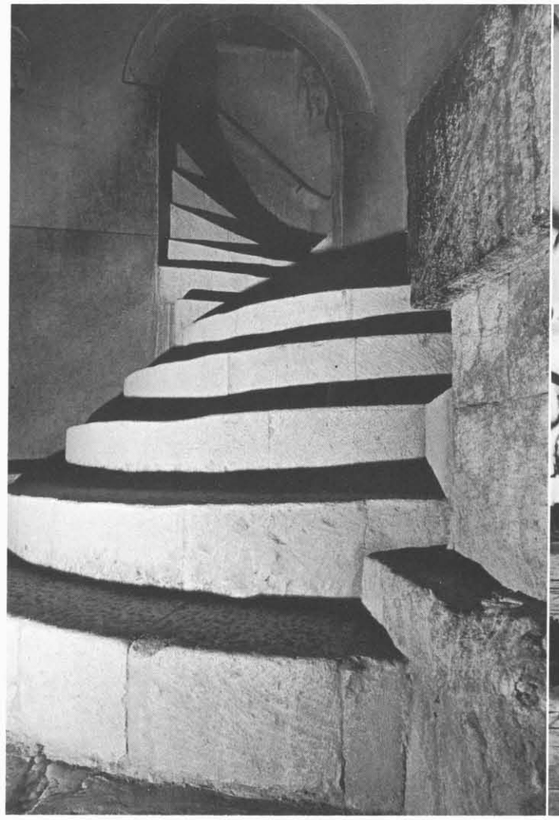
"...enclos'd on the east and west with exceeding high mountains; on the north it is bounded with the plain of



".... at Tyre .... Its present inhabitants are only a few poor wretches ... subsisting chiefly upon fishing ..."



"This city (Tyre) *standing in the sea upon a peninsula, promises something very magnificent..."*



Jericho, on which side also it receives the waters of Jordan; on the south it is open, and extends beyond the reach of the eye."

It could be said of course that Maundrell carried this tight, uncompromising approach too far. If in fact he merited criticism at all it would be that his writing was *too* disciplined, too impersonal. Throughout the book, for example, he never once identified any of the 14 bachelors who were with him beyond the impersonal, "we." It would not, on the other hand, be fair to say that Maundrell lacked either humor or wit. It is spare and restrained, to be sure, but nonetheless penetrating. In describing one of their camps he wrote:

"*We were sufficiently instructed by experience, what the holy Psalmist means by* the dew of Hermon, *our tents being as wet with it, as if it had rain'd all night.*"

Another example occurs in his description of a meeting with an Emir who demanded "caphars," a kind of tax, from the party:

"*...we arriv'd in one third of an hour at the emir's tents, who came out in person to take his duties of us. We paid him two caphars... and besides the caphars, whatever else he was pleas'd to demand. He eased us in a very courteous manner of some of our coats, which now (the heat both of the climate and season encreasing upon us) began to grow not only superfluous, but burdensom.*"

Nor was Maundrell's approach, even if admirably objective, totally without glimpses of him as a minister and as a man.

Such references as the Cedars of Lebanon being "remarkable as well for their own age and largeness, as for those frequent allusions made to them in the word of God," are clearly those of a man of God, as are his descriptions of Tyre as a city magnificent at a distance but lacking the glory "which the prophet Ezekiel describes" and whose fishermen he calls:

"*...poor wretches, harbouring themselves in the vaults, and subsisting chiefly upon fishing; who seem to be preserv'd in this place by Divine Providence, as a visible argument, how God has fulfill'd his word concerning Tyre, viz.* That

"*... that very part of Calvary, where they say Christ was fasten'd to, and lifted upon his cross, is.... at this day so high above the common floor of the church, that you have 21 steps or stairs to go up to its top...*"

"*... we went to see the church of St. John Baptist, now converted into a mosque ... The court is pav'd all over, and enclosed on the south side by the church....*"

"*Being return'd to the city* (Damascus), *we were shewn the gate at which St. Paul was let down in a basket ...*"

"*The Dead Sea is enclos'd on the east and west with exceeding high mountains ... on the south it is open, and extends beyond the reach of the eye.*"

The Cedars of Lebanon: "*The noble trees grow amongst the snow near the highest part of Lebanon...*"

it should be as the top of a rock, a place for fishers to dry their nets on."

In view of Maundrell's situation at the time of the pilgrimage it would have been extraordinary had certain unfavorable reactions not been reflected in his writing, for he was subject to numerous internal and external pressures. He was, for one thing, still affected to some degree by an unsuitable romantic attachment in England, the results of which had played a large part in his decision to accept the chaplain's post in Aleppo. He was, furthermore, a man in doubtful health (who was to succumb and die even before the book was published) and yet subject to the rigors of riding up to 10 hours a day in frequently inclement weather and over difficult terrain. He was a Protestant in a land openly hostile to and contemptuous of Christians, and in which the outlook of other Christians was completely different from his own.

These circumstances are reflected in an irritation toward the language and customs of those countries he visited.

For all that, Maundrell's criticisms are not significant. That there are traces of his own prejudices and the outlook of an Englishman of the 17th century is clear, but even they are marked with restraint or with irony and in sum add to, rather than detract from, the work as a whole, giving to it an essential ingredient of feeling that only heightens the impact of reality.

Despite the passage of many years *A Journey From Aleppo to Jerusalem* retains fresh appeal. Modern readers can find in it even now the qualities that have kept it alive for so long, qualities that were succinctly summed up by a subsequent traveler to the Middle East who relied heavily on Maundrell's work. It is, wrote that traveler, "a good and plain account of what we need to know." ■

David Howell, who spent four years in the Middle East with the British Council, annotated, and wrote the introduction for, a new edition of the Maundrell book published in March by Khayats of Beirut for its Oriental Reprint Series.

"*Libanus is in this part free from rocks ... but is perfectly barren and desolate. The ground, where not conceal'd by the snow, appear'd to be cover'd with a sort of white slates...*"

A DROP OF RAIN

BY DANIEL DA CRUZ

Back in the early 1950's Dr. Grover F. Brown had no idea that he would ever meet a man named Ahmad 'Abd Allah al-'Arfaj. Since Dr. Brown was then chief agronomist for the Soil Conservation Service of the U.S. Department of Agriculture in Washington, D.C., and Ahmad 'Abd Allah was a farmer in an oasis near the Arabian Gulf, such a meeting did seem unlikely. The two men did meet, however, and the Eastern Province of Saudi Arabia today is witnessing the sweeping changes that the meeting helped set in motion.

What brought the meeting about was the price of food in Dhahran, Abqaiq and Ras Tanura, the communities in Saudi Arabia where the employes of the Arabian American Oil Company (Aramco) make their homes. From the viewpoint of both housewife and cost accountant those prices were high. True, they included air freight charges of 14 cents a pound for the 1,000-mile flight from Lebanon. True, there was little local production of the vegetables, fruits and eggs that the employes in Dhahran needed. But the prices were still high.

To those who wanted to reduce prices and also help broaden the base of the economy in that area it was obvious that local production of perishable truck farm products, fresh eggs and poultry was the most sensible answer. It was equally obvious that local farmers, whose knowledge of modern agriculture, finance and marketing was then minimal, were unprepared to risk their modest resources on crops unfamiliar to a region where cultivation was generally concentrated on the date palm. To try and change this situation Aramco lured Dr. Brown away from Washington with the promise of a bushel of problems and a free hand in solving them.

For Dr. Brown it was a formidable assignment. Without a technical staff and without a comprehensive body of agricultural data, he was to introduce wholly different agricultural practices to local farmers, supply — at modest prices — Aramco employes with a wide range of vegetables and poultry products foreign to the region and at the same time coach farmers in ways of raising and marketing those products with a margin of profit.

Dr. Brown, a rangy, rugged man with a scientist's appetite for problems, acknowledges today that his first look at the land where all this was to take place was discouraging. "From the plane that brought me to Saudi Arabia I could look down at the barren desert," he says. "From that height it didn't look favorable."

At about the same time it didn't look favorable to Ahmad 'Abd Allah al-'Arfaj either. As a merchant, during the first 40 years of his life, Ahmad 'Abd Allah had traveled considerably, going as far as Iran and India before deciding, shortly before Dr. Brown went to Saudi Arabia, to try his hand at farming. To this end he took possession of 10 acres of *waqf* land — leased from a Muslim religious association on life tenure — in Hofuf, an oasis town of great age some 75 miles southwest of Dhahran. Because the 12-month growing season there can produce nine crops (California's fecund Imperial Valley produces eight), Ahmad 'Abd Allah had high hopes and so planted at the edge of the desert alfalfa, pumpkins, eggplant, tomatoes and a few lime and pomegranate trees. But his optimism had turned to despair as his crops succumbed, one after the other, to the onslaughts of such destructive pests as melon fruit flies, leafhoppers, aphids, spotted cucumber beetles, alfalfa worms and locusts. Conditions had reached such a low point that Ahmad 'Abd Allah was ready to rent his land to anyone who would take it. Then Dr. Brown appeared with an intriguing offer.

"Let me," said Dr. Brown, "take over one of your ten acres for an experiment. I will supply the seed, fertilizer and advice on farming methods to the laborers, and you will supply the land, irrigation, water and labor."

In approaching Ahmad 'Abd Allah in this way, Dr. Brown was hoping to overcome a reluctance, common to farmers the world over, to change traditional methods. Dr. Brown could offer the weapons which today stock the arsenals of modern farm technology: powerful insecticides, chemical fertilizers, hardy hybrid seeds, ways to stretch the growing seasons and the means of farming for profit as well as subsistence. However, only Ahmad 'Abd Allah, he knew, could put those weapons to use and Ahmad 'Abd Allah might well refuse to experiment with innovations. Therefore, on the simple premise that seeing is believing, Dr. Brown made his proposal.

In weighing the offer, Ahmad 'Abd Allah, as he frankly admits today, was moved partly by curiosity, partly by respect for Aramco's reputation for integrity, but mostly by sheer need. He gave his assent and the experiment began.

Unquestionably, that first year was difficult for Ahmad 'Abd Allah as Dr. Brown unveiled one innovation after another, some seemingly unwise. Why, he demanded to know, did Dr. Brown spread noxious chemicals on the plants when all the world knows that natural fertilizer is best? Why plant seeds that come in airless metal cans instead of those carefully husbanded from last year's crops? Why plant this weed cauliflower when you know very well that most Arabs here have not so much as seen it, much less eaten it?

To all such questions Dr. Brown gave answers, sometimes by analogies, sometimes by demonstrations, sometimes by just a simple appeal to wait and see before passing judgment. His most convincing answer, however, was the first yield of lettuce, carrots, cauliflower and a new strain of tomatoes growing from the experimental acre, crops planned by Dr. Brown right down to the last cut of the hoe. It was convincing because the experiment was clearly a success. From that one acre Ahmad 'Abd Allah made more profit than he did on the whole nine acres which he planted and managed himself. Impressed, Ahmad 'Abd Allah turned the remaining nine acres over to Dr. Brown forthwith to be farmed as the agronomist suggested.

Ahmad's experience was by no means rare. In Qatif, an area north of Dhahran, Muhammad Taqi, whose family owned large tracts of land on Tarut Island, offered to try some of the new methods. His father, however, refused to allow the use of insecticides, preferring to place his faith in nature. One season's comparison convinced him that it might be wiser to protect his crops himself, and before he died several years ago he had become one of the most progressive farmers in the area.

But the fieldwork was only a beginning. However successful they may be in the actual growing of crops, farmers cannot expand and improve their methods, their lands and their returns without markets. So it was with Ahmad 'Abd Allah and his fellow "cooperators," as Aramco calls its agricultural collaborators. Nothing caused greater misgivings among them than the lack of local markets for many of the crops they had been urged to plant. Dr. Brown had encouraged the production of vegetables completely alien to Saudi Arabian experience, promising that Aramco would buy a large portion of their output. But as the supply of cabbage, cauliflower, turnips, beets, lettuce and carrots began to outstrip Aramco requirements, the farmers converged on their adviser and gently suggested that perhaps it was a mistake to continue.

"Keep planting," was Grover Brown's reply and with a display of faith they did. The result was a sufficient surplus of products to enable the farmers to offer them to the local market at reasonable prices.

"It was a calculated risk," Dr. Brown explained later, "but more calculated than risky. You see, when many semi-nomads moved into settled areas after oil production began in earnest, one of the first things to change was their diets. Formerly they had depended on traditional sources of protein and carbohydrates — dates, for example, and livestock — but by 1954, the market was ripe for a transition to canned goods, fresh fruits and vegetables, particularly since home refrigeration had ceased to be a novelty. So it was really a matter of getting enough fresh produce to whet the public's appetite for new foods."

There was much more to it than that, of course. Exposing a product to the public is rarely of any use if the public doesn't know what it's for. "Take cauliflower or head lettuce," Dr. Brown said. "They were such strange foods here that at first people around Hofuf were naturally reluctant to spend good money just to try them. But we were prepared for that. Dietitians from Aramco's medical department organized classes at which Saudi housewives learned how to prepare each new vegetable in a variety of ways. In no time at all the demand for the new foods boosted the prices. Where the original price was about $2.30 a basket for cauliflower, for example, today's price is between $10 and $12 a basket, a very profitable level for the farmers. I might add that today less than 15 per cent of their production is sold to Aramco."

To broaden his sphere of operations to include more cooperators — there are now 46 — Dr. Brown found that the man in charge of technical assistance needed some assistance himself and so began the development of an all-Arab staff of agricultural specialists. First to come were Sami Labban, in 1956, and Raja Jeha, in 1957, both graduates of the College of Agriculture at the American University of Beirut; and Faysal Ruwayha, a Saudi graduate of Virginia Polytechnical Institute and Cornell University. On the staff today are also four Saudi Arabs who studied at the American University in Beirut under a special one-year agricultural program. Those men range from Qatif, north of Dhahran, to Hofuf, 75 miles to the south, advising any farmer who requests help (but only those who ask for it) on all phases of agriculture.

Meanwhile Ahmad 'Abd Allah and Dr. Brown had joined forces again, this time to try poultry raising. Maintaining his reputation as eastern Arabia's number one agricultural innovator, Ahmad 'Abd Allah became one of the first farmers to experiment in commercial poultry production. He needed little urging, for the market was

Inspecting produce on a farm at Hofuf are, left to right, Dr. Grover Brown, Raja Jeha, a specialist and Ahmad 'Abd Allah, owner of the farm.

HIS CROPS RUINED, HIS FUTURE BLEAK, AHMAD 'ABD ALLAH WAS ABOUT TO GIVE UP WHEN DR. GROVER BROWN APPEARED WITH AN INTRIGUING OFFER...

An old farm worker carries a basketful of freshly-cut vegetables to the collection point on Ahmad 'Abd Allah's farm.

wide open and the competition almost nil. Aramco again provided all technical services, designing feeders and other equipment to be made from available materials, selecting the proper breed — White Leghorns — for local conditions, even writing the order and facilitating Ahmad 'Abd Allah's transfer of credit. Soon, 2,000 day-old chicks came winging into Dhahran by plane from the Netherlands.

During the next two months Ahmad 'Abd Allah spent practically every waking hour with his chirping charges, superintending their feeding from an improvised mixture of cracked wheat, cracked corn, ground fish, dried alfalfa and dried eggs, on which they thrived. In his concern for the chicks Ahmad 'Abd Allah even brought a brood hen into the chicken house to provide a proper family atmosphere. The hen was rudely ejected the next day by the agricultural adviser, who emphasized that chicks grow not on mother love, but on proper feed, which they were getting in abundance.

Within three months every chicken was sold to neighboring farmers, some as pets, since white chickens were then a novelty, and Ahmad 'Abd Allah's initial investment of about 24 cents for each chick delivered plus about 80 cents to feed and keep it returned about $2.30, a profit of more than 100 per cent. The chicken boom was on and the cost of eggs began to drop. Today the production of eggs in Qatif and Hofuf totals more than 200,000 eggs a day. Of that output Aramco buys 65 per cent, the rest going to the local market.

There is little doubt that such graphic demonstrations had a telling impact upon farming in the Eastern Province. But there were much bigger problems facing the region too. One had to do with what is the single most important problem in agriculture the world over: water.

Contrary to what is generally thought about the Arabian Peninsula — where much of its 1,000,000 square miles is arid desert — the problem in the desert areas under cultivation is not always lack of water but sometimes an excess of water. This apparent contradiction has its origins in the geology of the region.

The rainfall which waters the plateau of the Najd in central Arabia ranges from zero to five inches annually, a meager supply if compared with the average of 35 inches in central Texas. But instead of coming down in gentle soaking showers which would give a limited productivity to the area, more often than not it pours down in a few heavy torrents, spawning flash floods — which sometimes drown unlucky shepherds in what, a few minutes previously, were bone dry canyons. Within a few hours the surface of the desert is as dry and dusty as before, the water having evaporated or seeped into the earth. Most of the rainfall from this huge plateau seeps down to impermeable strata far below the surface and then oozes downward and eastward through layers of spongy rock toward the Arabian Gulf at an almost imperceptible rate — estimated as one foot a year. In the Qatif-Hofuf area which is close to sea level the layers of spongy rock containing great quantities of water are closer to the surface, so close that farmers were often able to dig wells by hand down into the upper layer.

In its slow underground passage through the rock strata, however, the water absorbs large quantities of salts — mostly sodium and calcium — which in excess can seriously damage crops. Over the years the farmers, using low-cost labor, had dug and maintained open drainage ditches which were sufficient to control the slight excess water and drain off the harmful salts. Then came introduction of drilling rigs that could drive deep into the lower strata where lay an abundance of water under high pressure. Farmers, first happy as this plentiful supply of water gushed to the surface, were later dismayed as it became apparent that the old drainage ditches could not carry off the surplus. As the excess water accumulated, the water table underground began to rise, reaching, in some areas, the roots of the plants and even rising above the surface. There the sun evaporated much of the water, leaving a high concentration of salts behind. This continuing process eventually transformed much of the irrigated land into a stagnating salt water marsh in which almost no commercially valuable plant life could grow.

To Grover Brown all this was familiar. Identical situations exist in many parts of the world, including the enormous valley of the Indus River in Pakistan and India and a surprisingly large portion of the arid lands in the southwest regions of the United States. Around Qatif, however, the problem was magnified by disturbing factors which demanded immediate attention. The process of overwatering, in most places a gradual development, had taken place very swiftly in Qatif, where, in a relatively small area, some 300 uncapped artesian wells, six to eight inches in diameter, were spewing out millions of gallons of water. As a direct result, the food supply from the water-logged farms fell drastically, and with it the quality of what little food could be harvested. Prices shot up, laborers left the land to seek work elsewhere, and the situation steadily worsened.

From a strictly theoretical point of view, the irrigation and drainage of the Qatif region were fairly routine matters. Irrigation ditches already constructed on the farms would continue to supply water to the fields, but carefully graded, cup-shaped drainage ditches, approximately six feet deep, and four feet wide at the bottom with sides gradually sloping upward to shoulders about 25-30 feet apart, would collect the excess after it had passed through the upper layers of earth, and carry it — and its salts — to the Arabian Gulf nearby. The crux of the system was, of course, the difference between the level of the shallow irrigation ditches and the deeper drainage ditches, which permitted the water to seep

gradually from one to the other, washing away the plant-searing salts as it went.

By a network of main drainage ditches some 40 miles long, and other shallower ditches feeding into them, Dr. Brown hoped, the entire Qatif area could be adequately drained. He anticipated lowering the water table to at least four feet below the surface, well below the root system of most plants.

The only real technical problem was to determine whether the 25-foot drop from the ground level at Qatif to the sea three miles away was enough to keep the water flowing seaward (as it turned out, it was). Then came the task of translating the planning, which was done entirely by Aramco, into action which would be supported by the central and provincial administrations, as well as by the individual farmers through whose land the drainage system had to pass. Coordinated action on this scale is rarely easy, but the Saudi Arab Government working with Aramco planners, farmers and landowners broke ground for the project in 1960 and finished on schedule early this year. Construction of the whole drainage complex was paid for by the Saudi Arab Government. The government also pays for maintenance.

So successful did the Qatif drainage project prove to be that the Hofuf area, three times as large and with many of the same problems, also asked for assistance. The government has confidently moved ahead, on the basis of experience accumulated at Qatif, and recently let contracts with a German firm to construct canals over a 40,000-acre area in Hofuf.

Completed only this year in the Qatif area was a new, 40-mile long drainage system designed by Aramco and paid for by Saudi Arabia.

Grover Brown, like other Aramco employes, takes a two-month vacation in the United States every other year. Though he enjoys his work tremendously, the chance to renew old friendships and to have a change of scene from the desert sands comes as a welcome relief to him. But not to everybody. One cooperator from the Hofuf area, hearing that Dr. Brown was soon to go on home leave, collared an Aramco official and argued that Dr. Brown could not possibly be spared that long.

"Well, then, *how* long?" was the rejoinder.

The farmer thought for a moment. "Two weeks?" he suggested, hopefully.

Had he been there, Dr. Brown would have demurred. "I'm anything but indispensable," he laughs. "Everything that's happening here now would come in time whether we were here or not. I'm a catalyst. I build fires under people, but they do the work.

"Take the Wadi Sahba project in Haradh. Aramco will put about $400,000 into this scheme in planning and feasibility studies, but the actual execution of the project — which will open to cultivation a large inland area now completely barren — will cost $13 million and be done entirely by the Saudi Arab Government. We're doing proportionately less each year as more trained Saudis are able to shoulder the burden of development. The measure of my success is how quick I beat myself out of a job."

Such progress does not mean that all or even most of the obstacles facing Saudi Arabian agriculture have been overcome. The challenges ahead are still enormous and even the most progressive farmers still have major hurdles to overcome.

But a start has been made and when Grover Brown and Ahmad 'Abd Allah al-'Arfaj eventually go their separate ways they are unlikely to forget the ten years they labored together to make the desert green. If the face of the land is changed less than they would like, fields blooming in areas formerly barren give rise to hopes for a fruitful future. For, as the Arab proverb says, "The beginning of rain is but a single drop." ■

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Aramco President Thomas C. Barger examines field corn at the farm of Ahmad 'Abd Allah. Studies are being conducted to test the feasibility of growing field corn for use as poultry feed.

MEDINA

SECOND CITY OF ISLAM

A SMALL COMMUNITY IN WESTERN ARABIA, IT PLAYED A CRUCIAL ROLE IN THE LIFE OF THE PROPHET ...

BY 'ABD AL-QUDDOOS AL-ANSARI

In Medina, the Prophet Muhammad found at last the faith and unshakable support denied him by his own tribe, the Quraish of Mecca. In Medina were revealed to Muhammad the concluding *suras* — chapters — of the Koran, the foundation of Islam. In that city, Muhammad planned, and fought nearby, the three decisive battles against his Meccan foes. And from Medina he launched the host of believers, ten thousand strong, who awed his opponents into lasting submission. In Medina, Muhammad lived the final decade of his life, and there he died and was buried. From Medina the first three Caliphs, or successors of the Prophet, ruled the Arab empire.

So significant is Muhammad's arrival in Medina from Mecca, in 622 A.D., that the chronology of Islam rests upon that single momentous event. The very name Medina, which in Arabic means simply "The City" without further qualification, eloquently attests to its importance. Yet outside Islam, the crucial role it played in the development of a religion whose 435,000,000 adherents girdle the earth is all but unknown.

Compared to Mecca, a bustling, sophisticated trading center which was already the focus of animistic religion in the Arabian Peninsula, Medina was, in pre-Islamic times, an agricultural settlement called Yathrib by its inhabitants. Situated in a mountain basin on the uptilted western edge of the plateau of western Arabia, some 90 miles from the shores of the Red Sea, Yathrib owed its modest prosperity to plentiful water sources and lands made fertile by ancient lava flows. Citrus groves, grapes, figs, wheat, almonds, and dates, of which there were an estimated 130 varieties, provided a livelihood for the few thousands who dwelt there. Unlike Mecca, which was dominated by the Quraish, Yathrib was split into many factions, whose quarrels threatened to turn the city's precarious peace into anarchy.

A chance encounter by six pilgrims from Yathrib during the pagan festival at al-'Aqaba, near Mecca, with Muhammad ibn (son of) 'Abd Allah (as the Prophet was then known), proved to be the hinge on which the history of Islam was to turn. The men from Yathrib listened to the Prophet's preaching and his recitation of the Koran and eagerly spread his teachings on their return to their native city. To the Arabs of Yathrib, the word of God as revealed to Muhammad seemed the solution to their city's dissension, and the following year at al-'Aqaba witnessed the fateful meeting between Muhammad and a delegation of twelve from Yathrib.

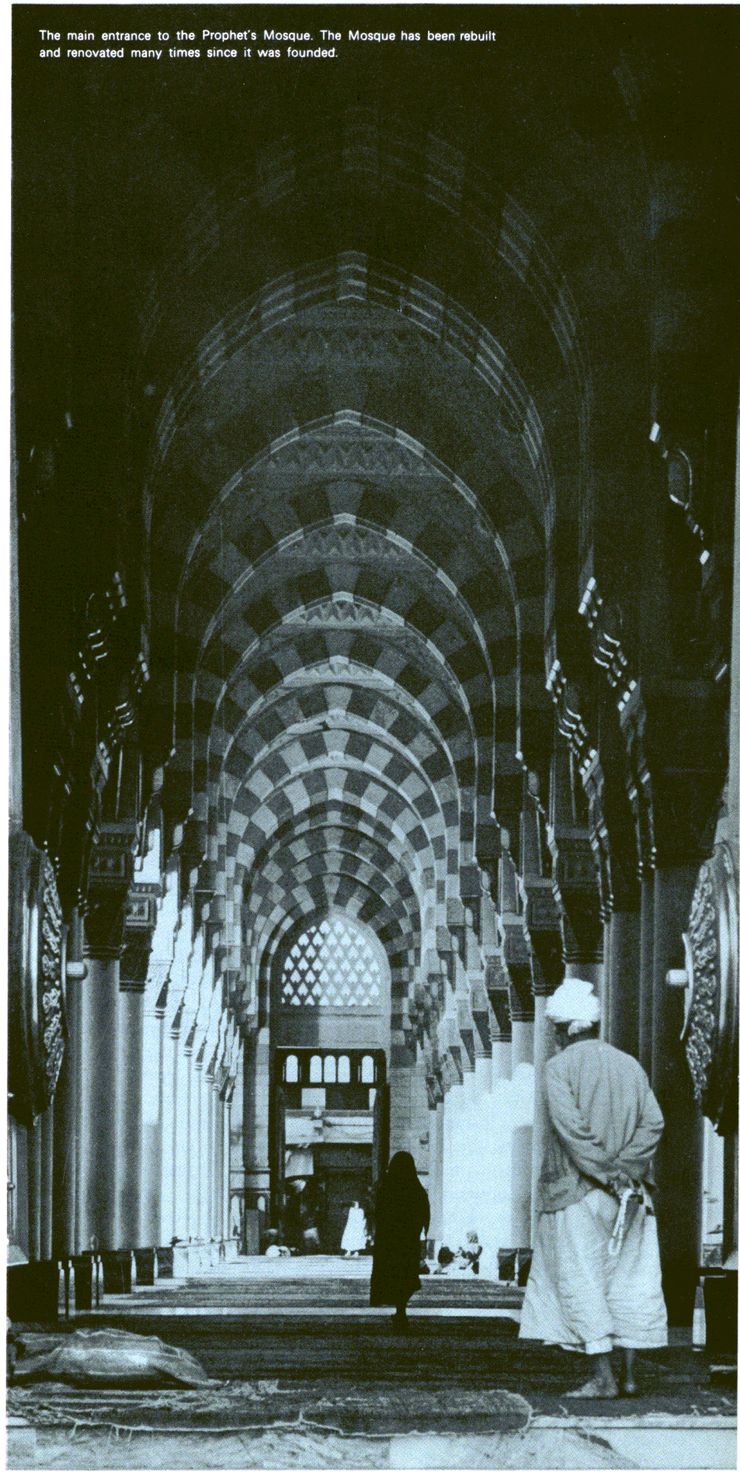
Won by his divine message, the men of Yathrib made with Muhammad a covenant, agreeing to eschew idolatry, theft and adultery, to tell no lies, to abjure female infanticide (a common practice in Arabia in those early days), and to abide by the ordinances of the Prophet. On their return home, they were accompanied by a reader of the Koran. The measure of the success of this, Islam's first missionary, was the submission of 73 men and two women from Yathrib to Islam at the next annual pilgrimage. The men from Yathrib also swore to defend Muhammad's life and teachings to their last breath.

The intercession of the men from Yathrib was timely. Muhammad had found the Quraish of Mecca singularly unresponsive to his revelations. Dismissed at first as an eccentric, Muhammad aroused more active opposition as his teachings attracted adherents, few in number but fervent in their belief. The commercial oligarchy which ruled Mecca feared, and rightly so, that the simple morality and surrender to divine dictates preached by Muhammad jeopardized their worldly rule. To such a degree had their attitudes hardened that, by the time the men of Yathrib pledged their lives and fortunes to the service of Islam, Muhammad and the small group of Muslims of Mecca were no longer safe among their fellow townsmen. Now the allegiance of the men of Yathrib offered Muhammad and his followers not only a sanctuary, but a challenge to convert the Medinites, and they determined to avail themselves of it.

Singly, and in twos and threes, Mecca's tiny Muslim community drifted away to Yathrib, just over 200 miles to the north, until at last only the Prophet, Abu Bakr, a loyal follower who would become Muhammad's first successor, and 'Ali, his son-in-law, remained in the city. One night Muhammad, accompanied by Abu Bakr, secretly left Mecca. Eluding their pursuers, they made their way to Yathrib.

The Prophet was received with jubilation by the populace, and from all sides beseeched to honor this or that family by being its guest. Fearing that by accepting the hospitality of one he would offend the others, Muhammad, according to pious tradition, mounted his camel and decreed that where the camel halted, so would he. The camel stopped at a clearing within the town, then at once arose and stopped again a little beyond, at the house of Abu Ayyub (later called al-Ansari — The Helper). For the next seven months Muhammad lived in the humble home of Abu Ayyub, while, with his own hands and the help of his followers, he built the first mosque of Islam in the clearing where his camel had first stopped.

Muhammad's early days in Medina were attended by a poverty unusual even for one who, like Muhammad, disdained personal comfort and pomp. In this agricultural community, farm labor was very nearly the only occupation, and the newcomers from Mecca, who had no lands of their own, were hard-pressed to keep alive. These *Muhajirin*, or Muslim immigrants from Mecca, were a real burden to their co-religionists the *Ansar*, or helpers, in Medina. So the Prophet made each one of the *Ansar* legally adopt a brother from the *Muhajirin*, and share his wealth with that brother, thus fusing the two groups into one solid social and political entity which became the nucleus of the future Muslim community. However, the



The main entrance to the Prophet's Mosque. The Mosque has been rebuilt and renovated many times since it was founded.

Prophet abolished this brotherhood after the battle at Badr.

The relative security of Medina had not caused Muhammad to forget his mission of uniting his people. His following in Medina grew steadily stronger until at length he was ready for a test of strength with the Meccans. Medina's position astride the north-south trade routes between Mecca and Syria, indeed, made such a clash inevitable. It came on the evening of the 17th of Ramadan, in the year 2 A.H. ("Anno Hegirae"—in the year of the flight), when Muhammad led his troops to meet the Meccans at Badr, 11 miles southwest of Medina. Opposing his 305 men, 70 camels and 3 horses was an array of 950 Meccans, 700 camels and 100 horses.

The Medinites, though vastly outnumbered, were confident of victory because they were fighting for the supreme cause. The Meccans rushed headlong at their foe while the Muslims, at Muhammad's strict orders, fought in closed ranks, hurled volley after volley of arrows at the Meccans and unsheathed their swords only at the last moment. The Prophet and his troops won a signal victory: by noon the Meccans had fled, leaving 70 dead on the field and an equal number captive, to Muslim losses of about 15.

The history of war would record the Battle of Badr as a trivial skirmish were it not for its far-reaching consequences. Islam was immeasurably strengthened by the victory, while the leaders of the Quraish now knew their very survival was at stake. In Mecca, preparations were renewed for war. In Medina, the Prophet reminded his followers that Allah Himself had guided their blades and missiles: "So it was not ye who slew them, but God slew them; and those shafts were God's, not thine."

Two more contests between the Meccans and Medinites, at the Battle of Uhud and the Battle of the Ditch, served to convince the Quraish that further offensives against Muhammad and Medina were pointless. So strong had his forces grown, in fact, that on the 10th of Ramadan in the year 8 A.H. he led his followers to a final confrontation of the Quraish outside Mecca. Realizing their inability to give battle with any hope of victory, the Meccans surrendered themselves to Muhammad's mercy, which proved infinitely greater than many a victor's before or since. Instead of giving the city over to rapine, the Prophet sought the reconciliation of his former enemies. Many of them, unused to and awed by such magnanimity in a conqueror in those days of violence, immediately embraced the religion they had formerly rejected. Destruction was reserved only for Mecca's pagan idols.

The two years remaining in the life of the Prophet saw the extension of Islam to nearly the whole of Arabia. A military expedition was even mounted against forces of the Byzantine Emperor Heraclius in Syria, and though the two armies never met in his lifetime, the threat of Arabian arms resulted in the submission of a number of petty Christian and pagan princes to Islam. During the ten years he spent in Medina, Muhammad planned 65 campaigns and raids and personally led 27 of them. Their success was as much a tribute to his shrewd leadership as to the devotion of his soldiers and his personal indifference to danger.

Medina itself became, under the influence of Muhammad, a practicing theocratic community. By precept and personal example, Muhammad instilled into the community a sense of the divine purpose which motivated him, a recognition that the life of this earth is purposeful to the extent that it fulfills the dictates of Islam. Unchanged and unchanging since the days of Muhammad, these "Pillars of Islam" impose on all believers five obligations: confess to the uniqueness and omnipotence of God and the prophecy of His Messenger, Muhammad; say five prayers daily, the first before daylight and the last about two hours after sunset; observe complete abstinence from food, water and stimulants, as well as complete continence, during daylight hours in the holy month of Ramadan; make a pilgrimage to the holy city of Mecca at least once in a lifetime whenever possible; and distribute at least one-tenth of one's income in alms to the poor.

Ten years after the *Hijrah* from Mecca, the 63-year-old Muhammad contracted malaria and on the 13th of the month of *Rabi' al-Awwal* (June 8, 632 A.D.), he died. According to tradition, the Prophet was buried under his wife 'Aisha's house, very close to the mosque which he himself built on his arrival in Medina.

The respect which Muslims pay to Medina as the site of the tomb of the Prophet is amplified by the presence there of the graves of some of Muhammad's kin, companions and successors. The Prophet's father, 'Abd Allah, his only son, Ibrahim, and his daughter, Fatima, some of his wives and the first three "orthodox" caliphs, Abu Bakr, 'Omar and 'Uthman—all found final rest in or near Medina.

The Mosque of the Prophet is the dominant visual feature of Medina. Islam has no sainthood, and thus the worship of any being other than God—even the Prophet Muhammad—is forbidden. Though a visit to the Mosque confers merit on the pilgrim, it is not obligatory according to the canons of Islam. Nevertheless, because of its powerful religious associations, to pray in the Mosque of the Prophet has been a goal of the faithful for more than 13 centuries.

The Mosque of the Prophet today is irregularly rectangular in form, 380 feet long on its north-south axis, 280 feet broad at the south and 220 feet at the north, the whole being enclosed by a wall 30 feet high. The south portion of the Mosque, approximately one-third of the total area, is covered by a roof of lead supported by 320 massive marble columns in 12 rows. This part of the Mosque contains *ar-Rawdah*—The Garden—and the *hujrah*, an enclosure open only to the custodians of the Mosque, which contains the tombs of the Prophet, the caliphs Abu Bakr and 'Omar, and, in a separate place, the Prophet's daughter, Fatima. The concealment of what to other religions might be objects of veneration is explained by a saying of Muhammad's: "O Allah, cause

Dominating Medina's skyline are the splendid minarets of the Prophet's Mosque.

not my tomb to become an object of idolatrous adoration! Allah's wrath falls heavy upon the people who have made the tombs of their prophets places of prayer."

Directly above the brocade-covered tombs rises the great green dome of the Mosque, the most lofty landmark on the horizon of Medina; rivaled in height only by the four minarets at the Mosque's corners and the fifth in the west wall from which the faithful are called to prayer. On either side of the Mosque grounds are colonnaded hypostyles which bound the area formerly occupied by Fatima's garden and the Prophet's well.

Twice burned, and repeatedly restored and enlarged by Muslim rulers of the city, the Mosque has changed in appearance but not in its essential character through the ages. Pilgrims in Medina perform their five daily prayers in this mosque, moving from one place to another and offering prayers of penance, thanksgiving and praise of God, and the Testification and the Profession of Faith.

The influence of Medina has been steady throughout the history of Islam, drawing Muslims to the scene which witnessed the final epochal events of the Prophet's life. But by the Middle Ages both Medina and Mecca had lapsed into comparative obscurity as political power gravitated steadily toward the Mediterranean. The Mosque of the Prophet, however, continued to be a place not only of respect but of learning.

The fortunes of war brought the Umayyads, the 'Abbasids, the Mamelukes and the Ottomans, each in their turn to assume control of the holy places, each embellishing the shrines according to the tastes of the age. But the monumental mosques, however impressive to the eye, are to the Muslim the least substantial part of his religion. For what is important to the true believer is not the form but the substance, and the substance of Islam is the word of God, as revealed to Muhammad at Mecca and Medina in the Holy Koran. ■

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