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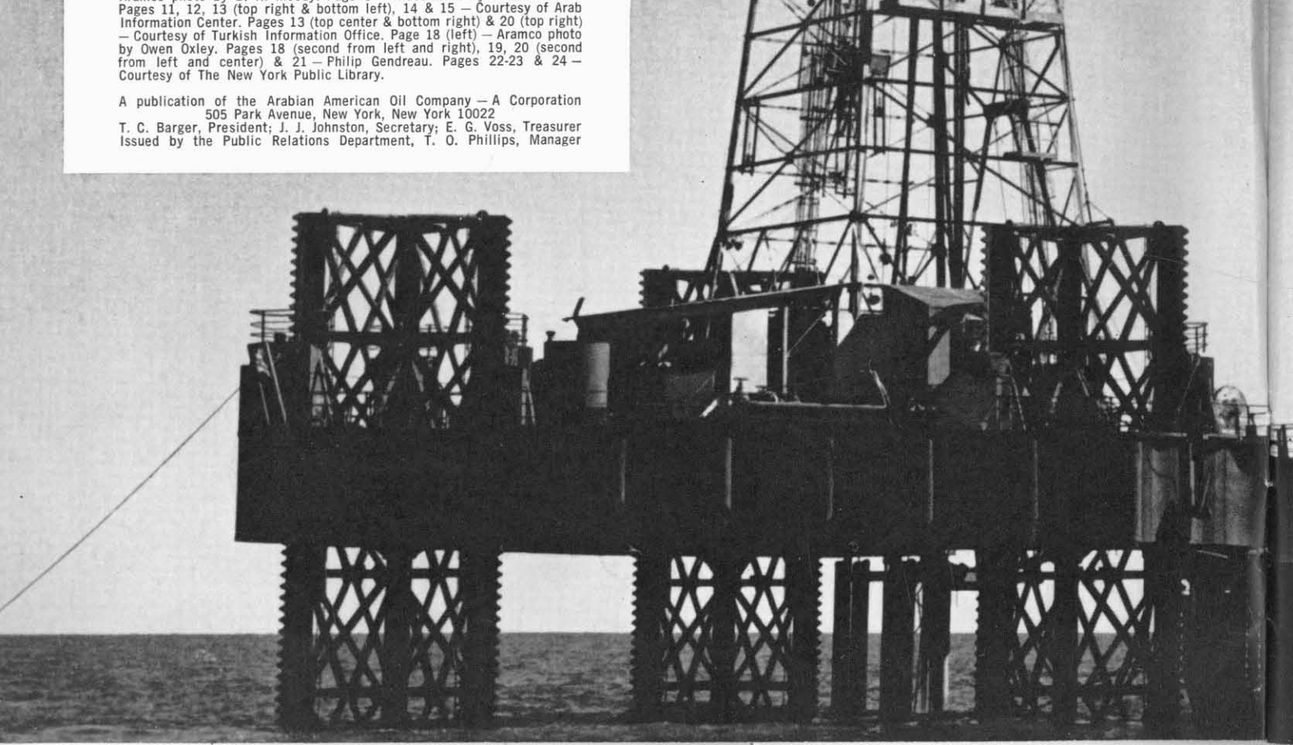
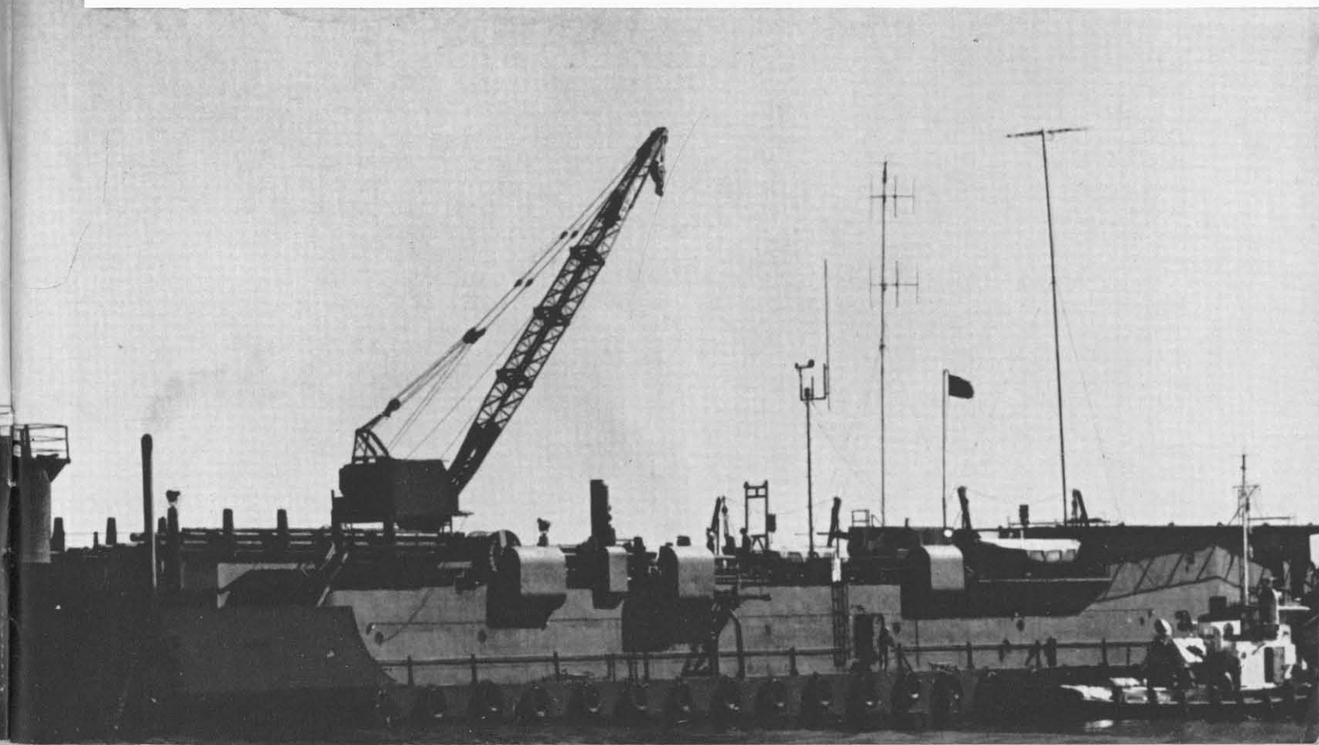
# Sea-Going Drilling Rig

## It sails across Persian Gulf waters like a ship but once in place, AMDP-1 is a sturdy, steel island

OILMEN HAVE CREATED some pretty strange-looking shapes in the course of getting petroleum out of the earth, converting it into products, and sending it to market. But nothing in the array of towering refinery units, weird pipe loops, squat spheroid tanks, and wheeled behemoths that trundle through marshland could have challenged for oddity the silhouette of AMDP-1 as it emerged from the hazy Persian Gulf sunrise off the coast of Saudi Arabia on May 10, 1958. And few pieces of oil industry equipment, on land or sea, have matched the hundred-day odyssey of this homely oil field workhorse. Tethered to a stout Dutch tug, it began its ten-thousand-mile journey at Vicksburg, Mississippi, on January 13, 1958, and after cruising at a steady three and a half knots an hour, hove to at the Ras Tanura marine termi-

Aramco Mobile Drilling Platform No. 1, serviced by Aramco Drilling Tender No. 1, drills Safaniya Well 47 in Persian Gulf.





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## PUTTING THE WIND TO WORK

strength and carrying power. Eventually, the skins were discarded, and the interstices of the wooden staves were caulked with pitch.

The heavily-staved coracle was probably the prototype of the planked boat. Though both countries eventually began to build with planks, Egyptian boatbuilding in wood does not appear earlier than about 2,600 B.C., while excavations at Ur produced a silver model of a plank boat in common use in Mesopotamia about 3,500 B.C. Judging from the model, the boat itself was 25 feet long and wide enough to accommodate three persons sitting side-by-side on each of the six board seats placed across the vessel exactly as in a modern rowboat.

The bottom of this boat was a flat plank tapered at the ends. Thwarts, or cross-pieces, were then nailed to the bottom with copper nails or wooden pegs, and planks then nailed to the thwarts to form sides. The wood was probably acacia or mulberry.

Although many scholars believe that the idea of a keel could only have originated from the early dug-out canoes of richly wooded countries, it is reasonable to presume that the notion of a keel as the backbone of a boat may have been derived from the wooden spine of the coracle. If such is the case, then Mesopotamia has prior claim to having originated this principle of shipbuilding, as well as that of water-displacement by contained volumes of air.

Long before they began to employ wood in boatbuilding, craftsmen along the Nile River tied together three bundles of papyrus reeds.

As for the first use of sails, Egypt had been given this honor until the discovery at Eridu, a few miles south of Ur, of a small clay model of a sailboat dating from about 3,500 B.C., and therefore pre-dating any previous evidence of Egyptian sails. Although there is no sail on this clay model, there is a socket in the center of the flooring, forward of amidships, for the purpose of holding a mast. Also, holes had been made in the gunwales on either side of the socket, obviously so that the mast could be supported by stays.

Today the site of Eridu is well inland from the head of the sea, but the city was on the shores of the Persian Gulf in 3,500 B.C. Its waterfront was undoubtedly busy at that time with a multitude of rivercraft, including many with sails. To build such planked sailing vessels the Mesopotamians also must have developed accompanying technologies such as tool-making, nail manufacture, rope and mat weaving.

Tools such as adzes, axes, chisels, and hammers were made out of native copper in that land as early as 4,500 B.C., and copper nails were also made, as were drills with copper bits. The working of wood included the cutting of mortises, sockets, and dovetail joints. The weaving of high-quality matting was a mastered skill in Mesopotamia by 5,000 B.C., and excellent ropes of various diameters were available by 4,000 B.C.

No doubt all the necessary skills were ready in the Middle East when the principles of the planked sailboat were discovered, whether they were discovered by keen observers such as Dejem, or otherwise. And, however speculation may roam upon the actual evidence, the fact remains that the Mesopotamians, using these early discoveries, progressed in shipbuilding until, in the third millenium B.C., they had established a great merchant fleet that spread international trade to Arabia, Africa, and India. ■

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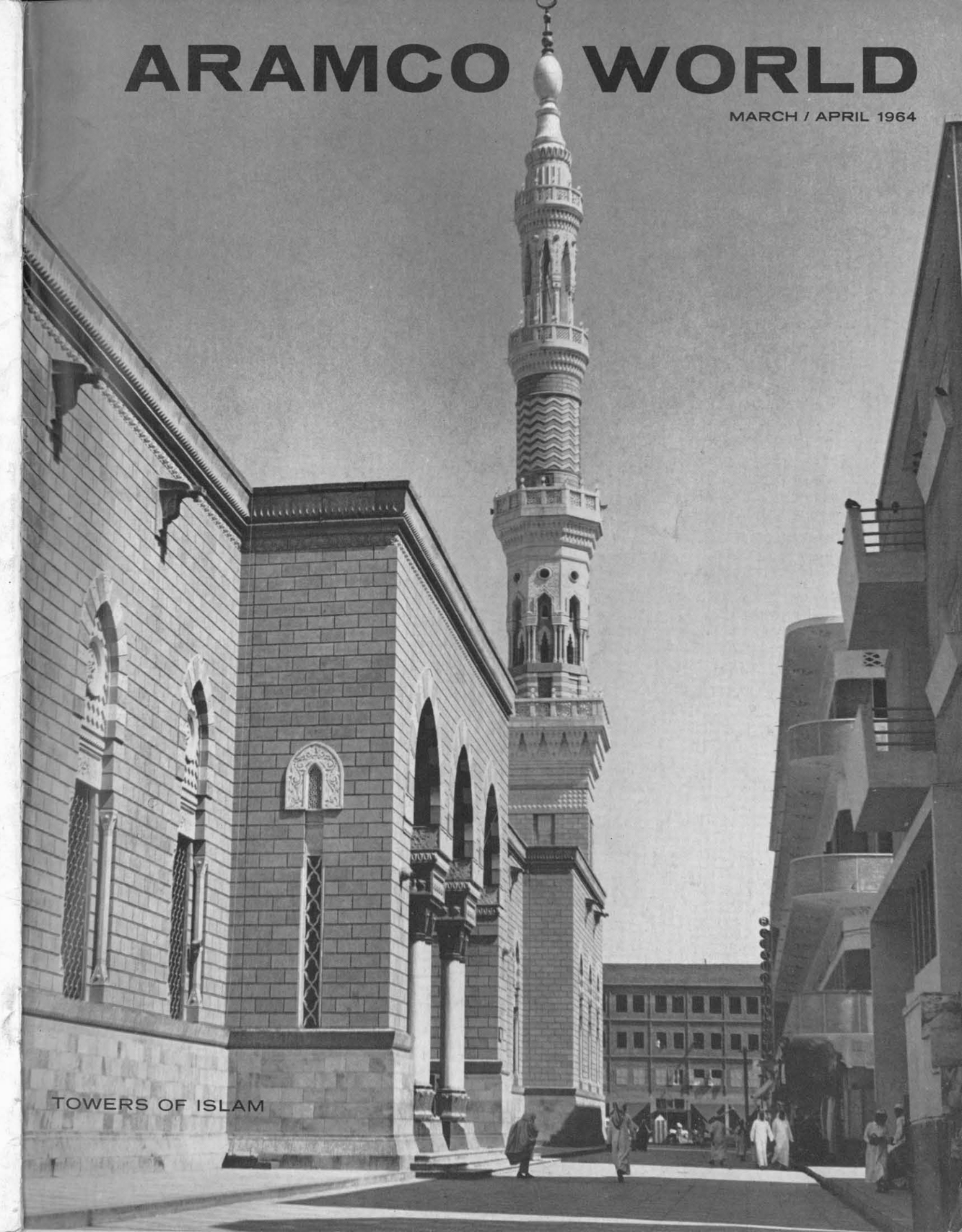
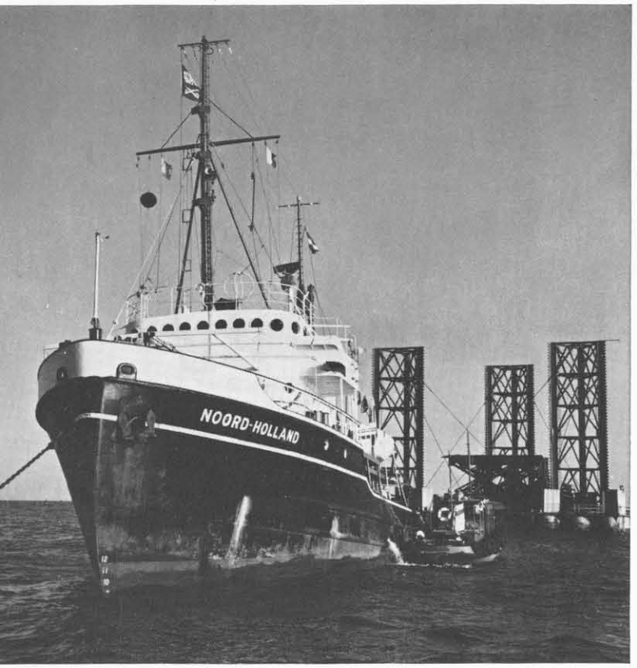


TOWERS OF ISLAM




Huge Dutch tug *Noord-Holland*, with AMDP-1 in tow, anchors off Ras Tanura, Saudi Arabia in 1958 after a 10,000-mile trip from Vicksburg, Mississippi.

## Sea-Going Drilling Rig

nal of the Arabian American Oil Company (Aramco) 15 weeks later.

To those who saw it pass, AMDP-1 (the Aramco Mobile Drilling Platform No. 1) must have seemed one of the strangest objects ever to have been borne of its own buoyancy across the ocean depths. A sailor conning it distantly at dawn on the horizon could have been forgiven for assuming that three terrifying sea beasts had fled the pages of ancient marine fables.

Despite its aesthetic shortcomings, AMDP-1 has its own kind of beauty – the elegance of logic. Moving across the water it is a boat; once in place, presto, it is a steel island – it is, in effect, a mobile island. Further, once it had been fitted out with a drilling rig, it borrowed from the towering symmetry of the derrick a handsome air.

Not long after it arrived at Ras Tanura five years ago, it was put to work by Aramco drilling offshore oil wells in the Safaniya Field, where it soon became a familiar sight, one that reflected technical rather than mythic marvels. It has three pylons that drop into the water and become legs. It stands upon the ocean floor and resists the force of heavy seas. It hoists itself out of the water "by its own bootstraps." It carries a full-size drilling rig.

However, its greatest singularity can be seen only in Aramco's ledgers – it saves the company more than $100,000 on every new offshore well. It represents a $1,650,000 investment and is an example of an important victory of technology over the constant increase in oil well drilling costs in offshore fields.

The story of the evolution of AMDP-1 goes a long way back in oil industry history. Almost as soon as they had appeared on the American industrial horizon, the big wooden derricks of the oil fields began their march to the sea. They stopped at the water's edge, but only briefly. By 1894, Summerland, the first offshore oil field to be developed in the United States, had been discovered near Santa Barbara, California. By 1903 a wooden pier that rested on stilt-like piles stretched out into the ocean at Summerland and a number of rigs drilled from it. Soon, men whose chief concern was location of buried pre-historic sea bottoms where oil might be found were coping with marine problems.

As geological data accumulated and geophysical instruments assumed greater precision, the geologists in the oil companies prompted their managements to obtain offshore concessions and risk large investments in wildcatting marine fields. The first great underwater discovery abroad was the Lake Maracaibo Field in Venezuela. Development of the field started in the 1930's. Producing men had to adapt land equipment for overwater drilling. It was a time when drilling rigs were still steam powered, and as one producing man recalled recently, "there were huge boilers on barges all over the place."

The first big break came when land rigs became diesel powered and "the whole system was lightened." The lighter power equipment made overwater drilling easier – the fixed drilling platforms, built upon long piles driven into the bottom, had to carry less weight. But ahead lay the complex problem of keeping costs down, even reducing them, as drilling in lakes, bayous, and coastal waters increased.

The big push into deeper waters came after World War II when world-wide oil consumption grew rapidly and spurred the hunt for new fields. Everything that had been learned about drilling platforms, barges that carried rigs aboard, and huge "sea islands" from which many wells could be drilled, was consolidated in a new technology. However, there was no simple answer, no universal design that would meet the on-site needs of every underwater field.

For instance, the floor of the Gulf of Mexico is soft, silty clay. This mantle is 200 feet deep in some drilling areas. On the other hand, the floor of the Persian Gulf is hard and little penetration is experienced by the feet (spud tanks) of AMDP-1 during drilling. Wave forces vary from place to place around the world, as do tides. The height of a wave is a function of wind direction, velocity, and "fetch" (the distance over which wind blows at a measured velocity). Thus, wave heights differ in offshore oil fields. Weather, of course, varies widely. It is interesting to note that WOW (waiting-on-weather) is the great offshore time waster. Sometimes a



With her legs resting on floor of the Persian Gulf, AMDP-1 is being readied for installation of drilling rig on the platform. Barge 136 (below), popularly known as *Queen Mary*, works with AMDP-1 at Manifa field. After nearly 10 years' service *Queen Mary* was converted in 1963 to pipelaying and heavy-lift barge.

## Sea-Going Drilling Rig

desert *shamal,* a hot, dry summer wind that carries aloft a fog of talc-fine sand particles, can reach 30 to 40 miles into the Persian Gulf and halt drilling.

Engineers have worked out several general types of design solutions for overwater drilling. Extremely costly fixed-pile, self-contained platforms have been built. They were like small communities. Their high initial cost and low salvage value led to smaller platforms that were also mounted on fixed piles but were serviced by tenders (often converted LST's). The next step was to free the drilling platform from a fixed position so that it could drill a hole and then move on to another well site. Thus the mobile platform was evolved. In most cases it requires the service of a tender and has to be moved by a tug. A great deal of ingenuity has gone into the engineering of these various overwater drilling systems. Their capitalization has been quite high, but they have enabled oil men to get further seaward in coastal waters.

In 1949, Aramco began its offshore exploration in the waters of Saudi Arabia. In 1950 the first overwater fixed drilling platform was erected not far from shore near Safaniya. The platform was served by a barge. The following year the Safaniya Field was discovered and a program of delineation drilling was begun. A special barge built to serve drilling platforms was purchased in Venezuela from the Creole Petroleum Company and towed to Saudi Arabia by tug. It had been known as the *Queen Mary* and the nickname remained.

During the early development of the Safaniya Field, the world's largest offshore reservoir, Aramco continued to use the fixed platform system of drilling. Heavy steel piles had to be driven into the sea bottom to support each platform. A drilling rig and derricks had to be mounted on each, and then dismounted when the well was completed – a time-consuming and costly procedure.

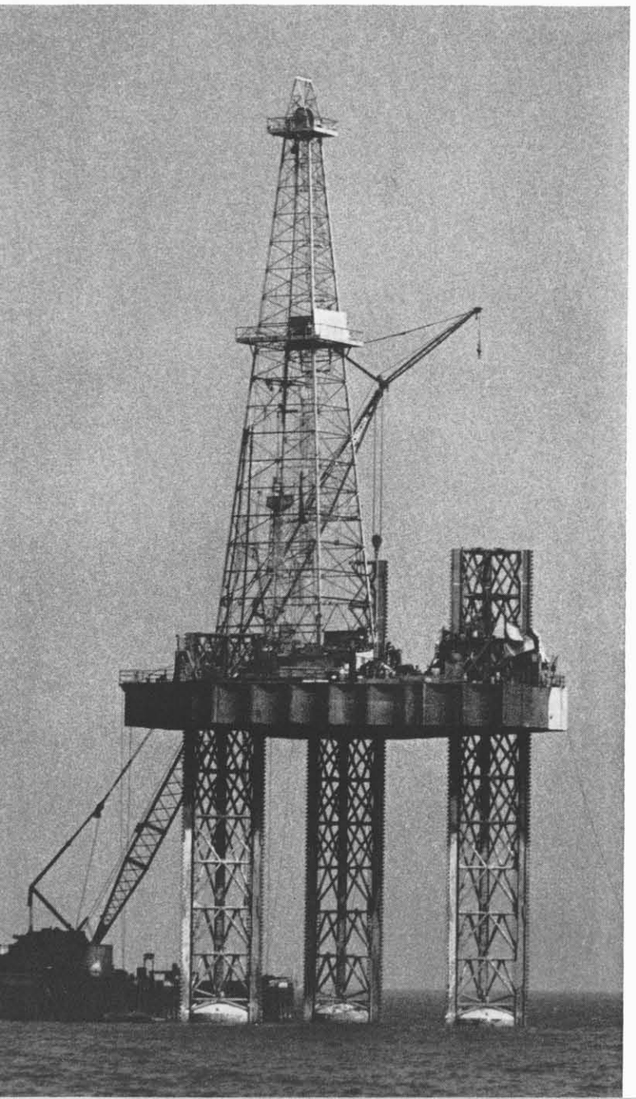
Aramco engineers began to survey the mobile drilling platforms in use in the industry. In the period 1955-1957 the Air Force placed four massive three-legged platforms – called "Texas Towers" – in early-warning radar service off the east coast of the United States. The triangle design had also found favor in many drilling companies, and Aramco's engineers, working with the design engineers of the R. G. Le Tourneau company, created a triangular mobile platform based upon Persian Gulf requirements. The platform was finished in 1957 and towed to Saudi Arabia early in 1958. It provided the means for a cost break-through in Aramco's offshore drilling.

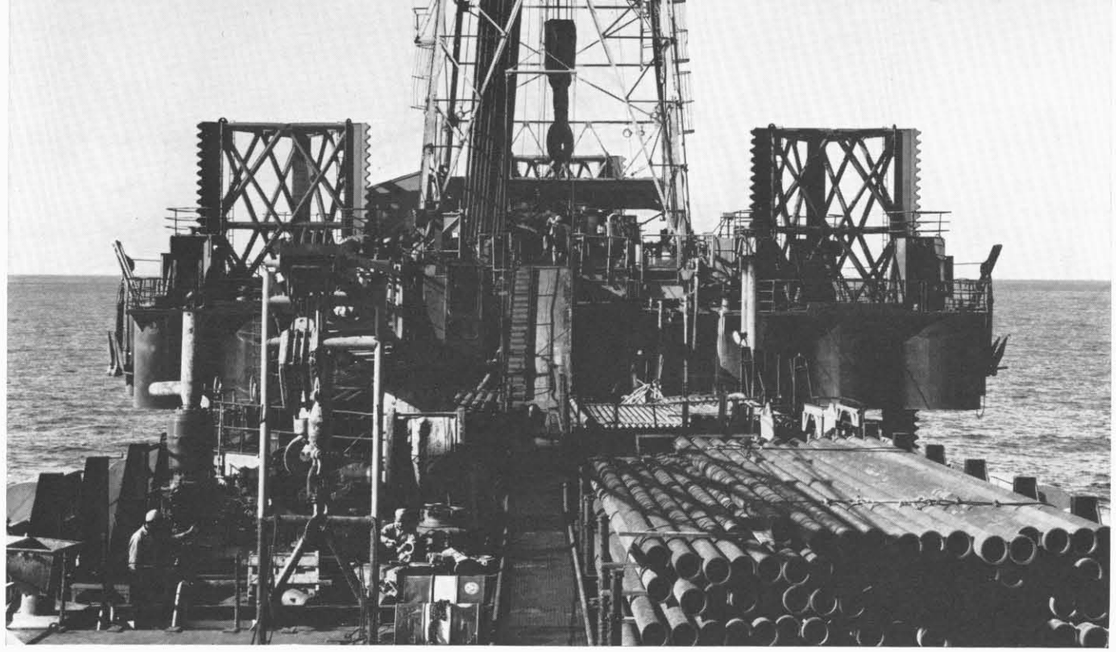
The Aramco platform, without drilling rig, is a model of simplicity in engineering design. Seen from above it is an isosceles triangle with a pylon (also triangular) rising from each point. The deck is 94 feet on two sides and 104 feet on the third. The flat bottom of the platform is identical – the two surfaces are ten feet apart and are, of course, enclosed by steel sides. The enclosed interior is divided by water-tight compartments. In the water this steel tank becomes a hull and is buoyant.

The three equilateral pylons, or legs (depending on whether they are up in the air or down in the water), are each 125 feet long and individually interlaced with tubular steel bracing. When viewed from the side, as one approaches on the water, their mode of elevation and retraction becomes clear. Three points of each leg are made up of gear teeth over its length from top to footing (a spud tank forms the foot). Three big gear boxes are mounted around each leg in the hull/platform. The gears for each leg let the leg down into the water until the foot is firmly set upon the sea floor. The gears continue to turn and the hull climbs up the legs and becomes a platform.

AMDP-1 operates in conjunction with the Aramco Drilling Tender No. 1 (ADT-1) which went into service in March, 1961, about four months after the barge *Queen Mary* was disabled by a storm. Before AMDP-1 is towed to

Safaniya, crane with 150-foot boom sets 22-foot leg extensions in place. tensions make legs 125 feet long and enable AMDP-1 to work in deeper water.





Aramco Drilling Tender No. 1, foreground, carries large quantity of pipe, drilling mud, and other materials, and supplies power to AMDP-1.

a new drilling site, a fixed production platform is prepared. This platform is smaller and can be constructed from lighter materials than those formerly used because with the advent of AMDP-1 the platforms no longer had to support a drilling rig and the tons of drill pipe that hang from the derrick in a deep hole during drilling.

When it is towed to a new site, AMDP-1's apex is its prow. Its stern, or base side, has a large slot which fits around and over the fixed production platform at the new well site. Once AMDP-1 is positioned around the production platform, the drilling rig and derricks are skidded from the center of the triangular deck over the slot. The rig is now in position to drill. The drill stem will pass through an opening in the fixed production platform.

When the hole is completed, the tender is towed off and then AMDP-1 is towed away. The fixed production platform remains with its big Christmas-tree valve complex marking a completed well. And AMDP-1 proceeds to its next assignment where the fixed production platform is already waiting.

The foregoing simplified procedure by-passed one crucial step – pre-loading. As mentioned earlier, an Aramco offshore well requires thousands of feet of drill pipe which may weigh as much as 100 tons. This weight, plus other operational loads must be taken into account when AMDP-1 is being footed on the sea bottom. It would not do to have the huge structure continue to settle during drilling as the drill stem lengthens and becomes heavier. Therefore, when the hull has climbed up out of the water about a foot and a half, sea-water is pumped into compartments in the hull until the weight of the added water equals the anticipated weight of the drilling load. The pre-load is then discharged, and the platform elevates itself to a position where its bottom is 24 feet above the water at low tide, based upon accepted marine standards. This elevation places the platform about 14 feet above the surface at high tide. This height accommodates ten-foot wave crests with an added four-foot surge clearance in case of severe storm conditions.

The tender carries all the auxiliary needs of the drilling rig – work water, drinking water, drilling mud, drilling cement, power generators, drill pipe, well casing, and so on, plus living quarters for the drilling crews.

Everything about AMDP-1 is proportioned on a massive scale. It can drill in low-tide depths of 77 feet of water. Its total displacement with drilling equipment in place is 1,001 tons. It is a mobile drilling island of impressive stability – blunt, solid, hefty. However, the level of its platform can be controlled with unusual precision and delicacy. Should an inclination develop of as little as *three-tenths of a degree* in any direction, an immediate adjustment is made. A pair of opposing levels, called inclinometers, tells the operator the direction and degree of tilt.

AMDP-1's platform climbs at the rate of one foot per minute – slow but secure.

Well by well, AMDP-1 has earned back for Aramco the original cost of $1,650,000 – but Aramco's engineers are ever pioneering new ways to further reduce drilling costs. Since it arrived in Saudi Arabia the hybrid hull/platform has undergone modifications which make it more stable afloat and permit it to stand in depths of water greater than it was originally designed to do.

AMDP-1 would surely not excite the eye of an admiral accustomed to the sleek lines of giant sea queens. It has, however, more than earned the Navy tribute, "Well done." ■

A modern rendition
of Suleiman,
based on an old engraving.

Unity was the prize that a great sultan won
in conquests from Budapest to Baghdad

# "SULEIMAN THE LAWGIVER"

In the year 1690, a Turkish visitor to Versailles wrote down these words in his travel diary: "The King of France is the Sultan Suleiman of our time."

This is a startling observation in view of the fact that Louis XIV of France was himself usually the standard by which the crowned heads of Europe were measured. Versailles, the Sun King, the Royal Court, French rule across much of Europe – such are the distinguishing marks of Louis' great reign during the seventeenth century.

Who was this man Suleiman to whom the mighty Louis was compared, this man who ruled from the banks of the Bosphorus long before Louis was born? With Suleiman's name go the words Constantinople, the Grand Turk, the Imperial Divan, as well as his sovereignty from Budapest to Baghdad, from Mesopotamia to Morocco. Suleiman the Magnificent beat Louis XIV by more than a century in creating a personal and political supremacy that others imitated as a model but could never hope to equal.

Europeans who saw him at the height of his power left no doubt of his effect on them. This passage is from a report by the Venetian Ambassador, Bernardo Navagero, writing in the year 1553. "The Turkish Court is a superb sight, and most superb is the Sultan himself. One's eyes are dazzled by the gleam of gold and jewelry. Silk and brocade shimmer in flashing rays. What strikes one about Suleiman the Magnificent is not his flowing robes or his high turban. He is unique among the throng because his demeanor is that of a truly great emperor."

Similar reports flowing from Constantinople back to the capitals of Europe caused the Turkish Sultan to be known as "Suleiman the Magnificent." Within the borders of his own empire a nobler title was heard. His subjects called him "Suleiman the Lawgiver."

Born shortly after Columbus discovered America, he grew up in the midst of historical developments almost as revolutionary as those that were transforming the West. His great-grandfather, Mohammed II, had shaken the world by capturing Constantinople in 1453. The Ottoman Turks vaulted the Bosphorus, established themselves firmly in the Balkans, and gained control of the Dardanelles. Mohammed's grandson, Selim I, conquered Persia and Egypt. Selim's son thus inherited an imposing empire around the eastern end of the Mediterranean Sea.

Suleiman the Magnificent extended the borders of his domain on all sides. He possessed the wherewithal to do this. The flower of his troops was the celebrated Janissaries,

the world's most disciplined infantry. His cavalry was unmatched because the Turks had been expert horsemen ever since the days when they rode into the Middle East from the steppes of Central Asia. His artillery was better than any guns his armies faced. Europe would learn to make accurate guns from those they captured from Suleiman. At sea, he had swift galleys commanded by bold admirals like Dragut, the "Drawn Sword of Islam," who swept the Mediterranean with his warships.

Under Suleiman the Magnificent, Ottoman power reached the western Carpathians and the Persian Gulf; it almost reached the Caspian Sea and the Straits of Gilbraltar. The military masterpiece of these campaigns was the Battle of Mohacs in 1526. The Sultan pushed up through the Balkans into Hungary. The King of Hungary moved south to meet him. The decisive conflict took place on the plain of Mohacs along the Danube; it was decided by the Turkish tactics of luring the enemy forward into a deliberately weakened center and then attacking them with massed reserves on both flanks.

The outcome of the Battle of Mohacs is described in a single sentence that Suleiman wrote that night: "We are resting at Mohacs where we have buried 20,000 Hungarian infantry and 4,000 of their cavalry." Hungary was his. He intended to take Austria as well, but the length of his supply lines forced him back from the gates of Vienna.

The Sultan's conquests made him the leading sovereign of the sixteenth century, a time of worthy contemporaries – Charles V of Spain, Francis I of France, and Henry VIII of England. Francis, indeed, asked and got an alliance with Suleiman during the wars between France and Spain. One result of the alliance was the fierce sea duel between Dragut and Andrea Doria – the stand-off that left the northern Mediterranean European, the southern Mediterranean in Islamic hands.

Now Constantinople became the glorious metropolis of the Ottoman Empire, a worthy capital for Suleiman the Magnificent. The reign achieved an architectural importance because the Sultan was a builder on the grand scale. Many art historians consider the Mosque of Suleiman to be the most beautiful of Ottoman buildings. Finished in 1556, it shows Byzantine influence in its basilica architecture, but the balconies and tall minarets are distinctly Islamic. Besides many other mosques, Suleiman concentrated on schools and municipal improvements. The Aqueduct of the Forty Arches brought fresh water from the hills into the city. Suleiman was directly responsible for Constantinople's "face lifting." He gave orders to his builders just as he did to his generals on the battlefield.

The people lived in a well-ordered city. It was divided into four quarters for administrative purposes, and the officials, judges and patrols of the Sultan enforced respect for law and order. They collected taxes; they supervised commerce; they kept the thronged streets of Constantinople free of thieves.

The Ottoman Empire was less easy to regulate. Stretching from Budapest to Baghdad, it comprised provinces and peoples entirely different in their beliefs, habits, customs, traditions and aspirations. Unity demanded that their laws be synchronized, at least on fundamentals. The Sultan accomplished this task by leaving localities to their own practices as far as was consistent with imperial needs. Thus, while he made no attempt to impose the conditions of Turkish bazaars on Hungarian markets, or Turkish land ownership on Morocco, he did impose everywhere his rules concerning commercial honesty and equitable taxation.

He caused the codification of laws to be promulgated throughout his territories. They worked so well that Suleiman revived memories of a predecessor in Constantinople, the illustrious Byzantine Emperor, Justinian. Another lawgiver had appeared – Suleiman the Lawgiver.

The Sultan was the undisputed head of the government. He was not, at the same time, an arbitrary despot. He observed the Law of Islam and the laws that he himself had issued to his subjects. He allowed his subordinates proper latitude in carrying out their assignments, and he chose them for their ability. The Austrian Ambassador, Ghiselain de Busbecq, testifies to the democracy of the system. "In making his appointments, the Sultan pays no regard to any pretensions on the score of wealth or rank, nor does he take into consideration recommendations or popularity; he considers each case on its own merits, and examines carefully into the character, ability and disposition of the man whose promotion is in question."

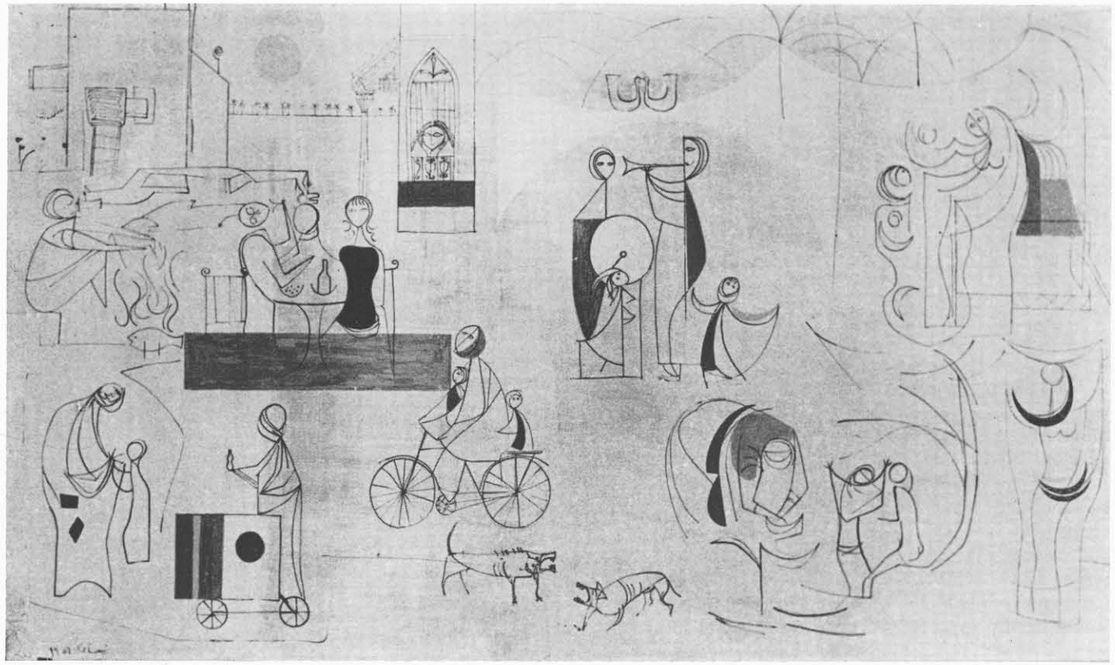
So were filled the government posts, the highest of which belonged to the Divan, the Council of State, which met in the Hall of Audiences at the Palace. Here major affairs of domestic and foreign policy were decided. Here arriving ambassadors walked into the splendor of the regime as they moved between glittering ranks of courtiers to the throne on which the Sultan sat.

Envoys from friendly states received invitations to visit the royal apartments. They dined with the Sultan on golden plates. They answered his astute questions about conditions in Europe or Africa. They listened to him as he talked with poets and historians or examined the polished work of his jewelers. It was always a treat for them when they were invited to sail across the Bosphorus aboard the royal barge and to stroll with him through the court gardens on the opposite shore.

They found their host a cultured man. Often enough he could speak to them in their own languages, for he had become a proficient linguist in order to converse with his officers who came from his border provinces. He not only loved literature but wrote verses of his own. He was merciful by temperament and by philosophy. "I amnesty prisoners," he said, "to make useful citizens of them." His piety was so marked a trait of his character that he prized the title "Commander of the Faithful" above all others.

He took his duties so seriously and performed them so ably that he left an imperial heritage to his successor on his death in 1566. He bequeathed to posterity the memory of a golden epoch above Constantinople's Golden Horn – the epoch of Suleiman the Magnificent. ■

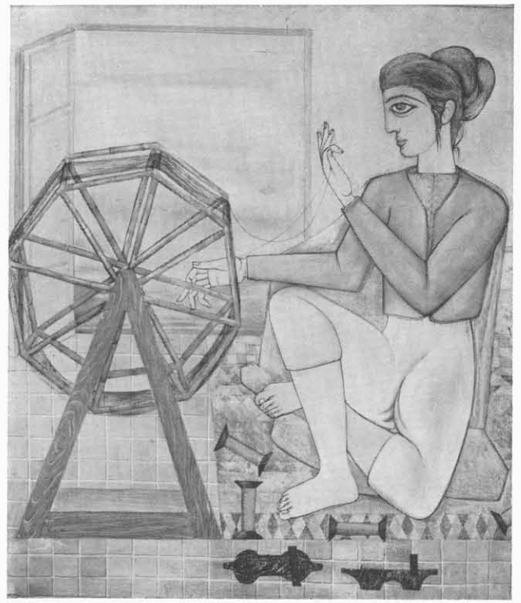




A painting in the modern style by the versatile Iraqi artist, Jewad Selim.

*Across the Middle East the old and the new are finding creative expression in works*

# from the artist's hand



"The Spinner" by Jellal Ben Abdallah of Tunisia.

"I DO NOT HAVE a recent past. I am compelled to penetrate into the ancient past, which is about to disappear under the sands of time." Although the writer, Tewfik El-Hakim, is a playwright, he might just as easily have been speaking of Arab art.

Muslim art today is a striking synthesis of folk traditions and modern painting trends. Yet it was not always so. For six centuries, the fine arts of the Middle East slumbered and when they were finally given new breath, the glories of the past provided the major inspiration for Middle Eastern sculptors and painters.

For generations, many of the peoples of the Middle East had expressed their creativity in decorative designs based on geometric and floral figures or on calligraphy. Their ceramics, mosaic tiles, stone sculpture, miniatures and architecture – much of it in connection with religious themes – were unsurpassed for beauty of line and color and painstaking detail. But painting and sculpture depicting vignettes of everyday life were absent from the artistic scene.

When Muhammad established Islam in the early seventh

## from the artist's hand

century, many of the Arabs were nomads. Since, at that time, they had little artistic heritage of their own, they studied and adapted the finest creative genres of the peoples around them.

There were two principal influences – the Eastern Christian (or Hellenistic) and the Persian. As it developed, the humanistic and naturalistic principles of Hellenistic art were gradually replaced by the decorative characteristics of Persia. Flat, brilliant colors had already supplanted the subtle shades of Byzantine and Greek art during the fifth century, human figures had become stylized and symbolic, and delicate Persian miniatures and illuminated manuscripts had exerted a strong influence on Arab art. The Chinese touch, which had been introduced through Persia, was especially apparent in Arab pottery. Styles and patterns were borrowed, but the Arabs developed several techniques which later became characteristic – covering painted designs with transparent glaze, painting over opaque glaze, and the luster process.

The art of calligraphy was cultivated by Muslims from earliest times and was more esteemed than painting, which generally took the form of wall art.

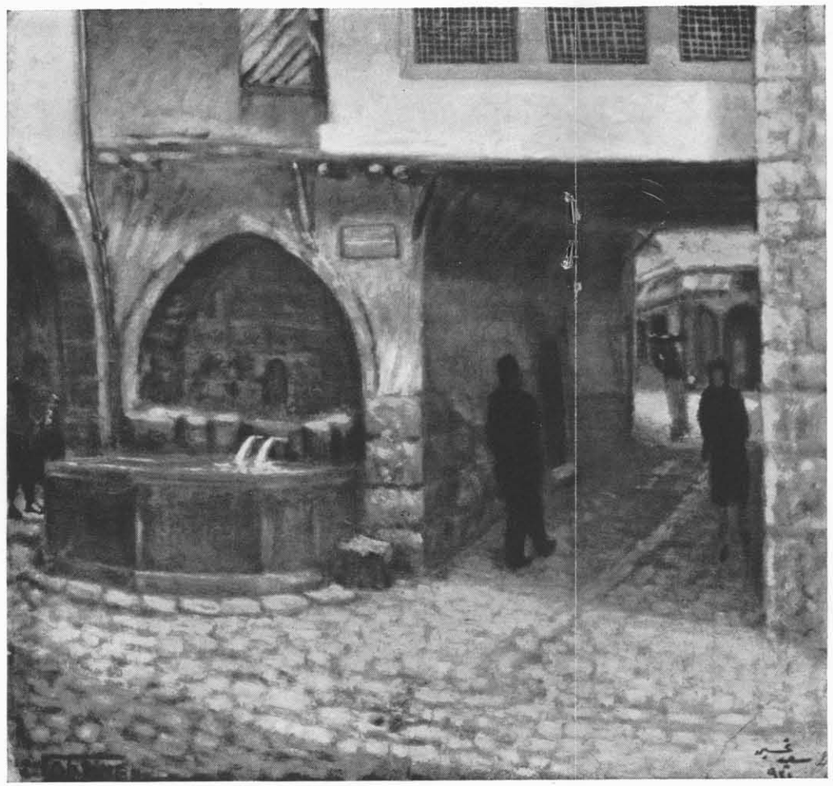
There are two principal styles of Arabic writing – Kufic, a formal script with angular letters, and Naskhi, a cursive style with rounded letters. Kufic was used for about 500 years to copy the *Koran* but was eventually succeeded by Naskhi during the eleventh century. The tradition of artistic writing and illumination of manuscripts has continued into the present but no longer holds the pre-eminent place it once did in Middle Eastern art. Nonetheless, calligraphy still exerts a powerful influence over modern Arab artists, as in the abstractions of Syrian-born Madiha Umar.

A short-lived school of Arab painting came to fruition in the early thirteenth century in Baghdad. It was distinguished by a major work by its leader, Yahia Al-Wasiti – an illustration of an Arabic literary classic, *Maqamat Al-Hariri*. But 20 years later, the conquest of Baghdad by Hulaku the Mongol in 1258 spelled the end of this movement.

It was only at the turn of the nineteenth century – 1808 is the accepted date – that painting as a valid and important means of expression began to attract Arab intellectuals. History was the principal source of inspiration, and most of the works depicted past days of greatness. The Arab artist drew on such themes as the victories of Saladin or Omar entering Jerusalem. The output of this period can be compared to that of the Western world in which Greek and Roman mythology formed the subject matter for artists.

Muslim artists next passed through a period during which much of their subject matter predicted an utopian future. Many of the paintings of this period depicted idyllic islands





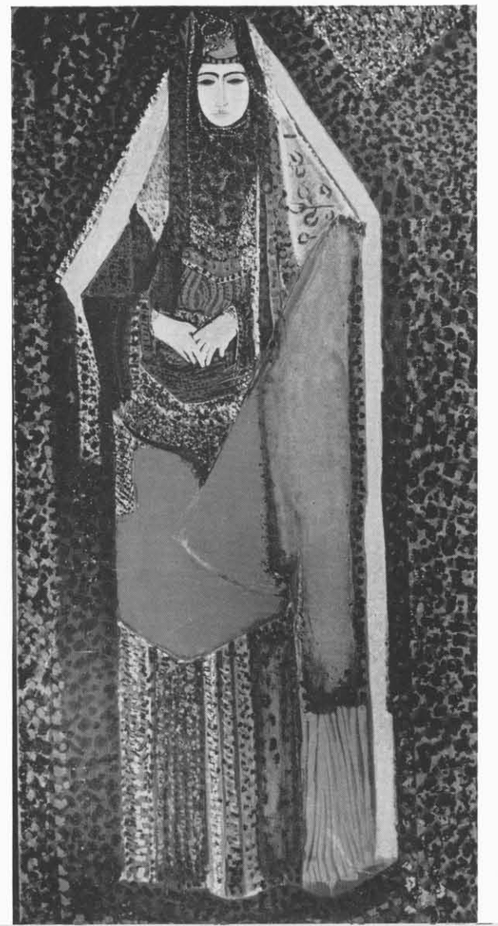
"The Drinking Fountain" by Said Tahsin of Syria.

Christmas card design showing the Madonna and Child by Bedri Rahmi Eyuboglu of Turkey.

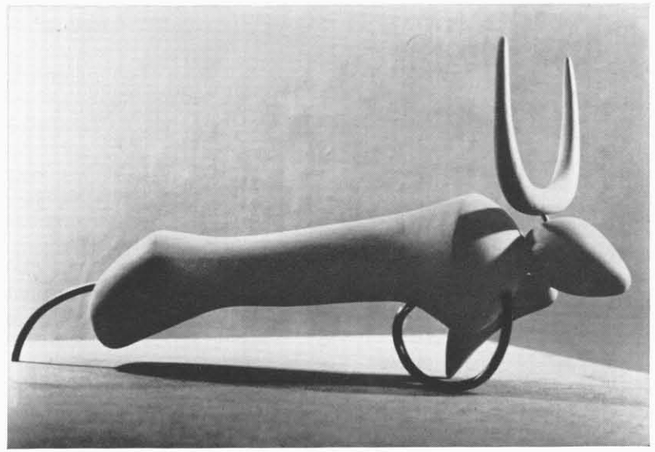
Painting in oil on canvas entitled "Three Generations" by Amar Farhat of Tunisia.

Drawing entitled "The Birdcatcher" by Abdelaziz Gorgi of Tunisia.

"The Blue Horse" by Hamed Nada of Egypt.



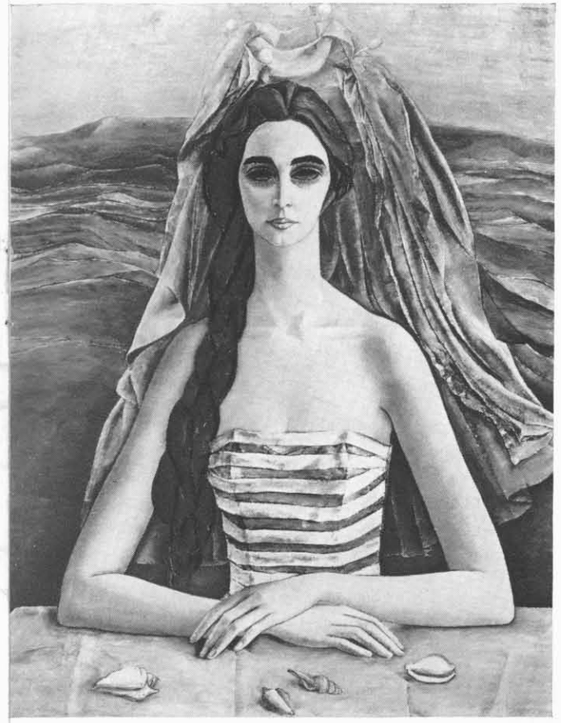
An example of modern Turkish art, entitled "The Bride," by Bedri Rahmi Eyuboglu of Turkey.



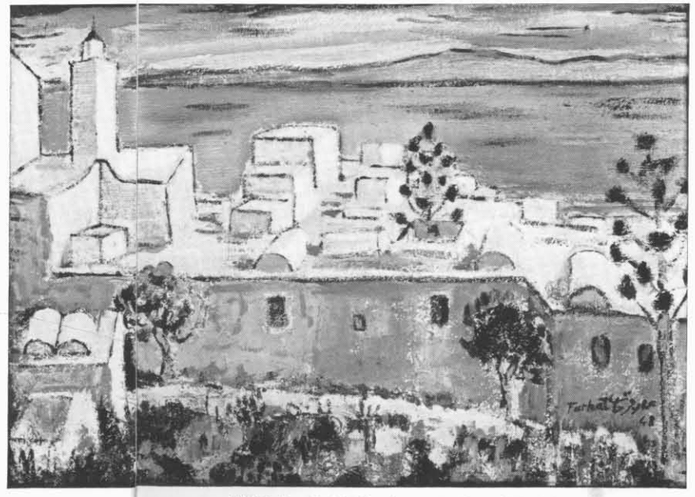
"Head of a Girl" fashioned in wood (left) and modern sculpture by Jewad Selim of Iraq.

Village scene entitled "Cabins" by Ezzeddine Hammouda of Egypt.





Portrait in oil by Ezzeddine Hammouda of Egypt.



"Sidi Bou Said" by Amar Farhat of Tunisia.

## from the artist's hand

where the people lived in harmony close to the soil and to each other.

Arab art needed broad social and political change to infuse it with new life, to turn its vision outward and enlarge its audience. The two world wars provided this impetus. Arab artists started to study in the great art capitals of Europe. They came in contact with all the "isms" – cubism, primitivism, realism, impressionism. Most important, however, they realized that what made their heritage unique was liable to pass into history unrecorded except for a few intrepid Western voyagers who had sketched the scenes they encountered on their Middle Eastern travels.

The reawakening started in Egypt, Lebanon and Tunisia. It later spread to most of the Middle East.

It started when Muslim artists rediscovered the human figure, switched from abstraction to representational painting, and realized the value of their native inheritance. This about-face is best expressed by such artists as Bedri Rahmi Eyuboglu of Turkey, Said Tahsin of Syria, Zoubeir Turki of Tunisia, Aida Marini of Lebanon, and Jewad Selim of Iraq. Muslim art today attempts to preserve the passing scenes of the Arab world – to "keep them a bit longer and make them known," according to Miss Marini, one of the leading women artists in the Middle East. It does so within the framework of modern artistic techniques, yet the vibrant pure colors and simple lines of most of these artists is uniquely Levantine.

The Turkish school of art, on the other hand, had had contact with the West for many centuries through the sultans of the widespread Ottoman Empire. Painting had always been one of the essential expressions of the Turkish character. Even before Islamic art became a reality, Turkish artists were adept at miniatures which showed a fierce realism and power typical of the modern Turkish school. Unlike other Muslim nations, they did not restrict the usage of the human form. The early Seljuk sultans decorated their palaces with painted frescoes, and Sultan Mehmet II notably encouraged painting by inviting Bellini to his new capital of Istanbul to sit for his famous portrait.

Modern Turkish painting began about 1914 when certain Turkish painters, having studied in Paris, brought home the influences of French impressionism. The Academy of Fine Arts in Istanbul soon became the center of the contemporary art movement, and even today many of the country's best painters are professors there.

Muslim art is coming into its own. Arab, Turkish and North African artists have recaptured a pride in their birthright while remaining within the rising tide of national economic, social and political ambition. There is a feeling of ferment and innovation in the air. ■

# Samarkand, 751 A.D.

When the five-day battle was done

and the defeated Chinese

turned eastward, they left behind

a skill of incalculable value

SPEAR-STRAIGHT, the Caliphate's governor Abu Muslim watched those battered war-prisoners streaming through the gates of golden Samarkand. Suddenly he put a hand on the shoulder of the leathery man standing beside him: the Arab general Ziyad ibn Salih, home in triumph after his decisive fight on the banks of the Talas.

"Well done, Ziyad ibn Salih. This is the end of our Korean enemy and his Chinese army. Now will the law of the Prophet prevail over this vast land, from Arabia to the wall of China itself."

A light breeze fluttered the flags of the victorious Arab legions, and Abu Muslim smiled tightly. On this day in the summer of 751 A.D. – thirty-nine years after the Arabs had taken Samarkand – China was finished in central Asia; Arab dominion and the faith of Islam were established in Persia and in western Turkestan. And – though Abu Muslim didn't know it yet – the Chinese tiger, scurrying home across the mountains, had left a prize more valuable than any plunder.

Paper!

Fitting that the prize should go to Samarkand, wealthy station on the long, hazardous trade route between China and the West. Here, in the richly fertile valley of the Zarafshan River, there had been a city since the second millenium before Jesus. Here the silks of China met the fabrics of Persia, and to the T'ang court Samarkand had sent ambassadors with gifts – a lion, fancy yellow peaches, and gems, and ostrich egg cups. Other cities had done likewise, for T'ang China had swung a lot of weight in central Asia.

But now T'ang was on the run, because its general Kao Hsien-chih ("that Korean enemy") had cut off the wrong head at the wrong time for the wrong reason.

Four years earlier, Kao Hsien-chih was riding high. Emperor Hsuan-tsung had sent him to clean out the Tibetans who were blocking the Pamir Mountain passes on the East-West trade route, and, by a fine combination of tactics and treachery, clean them out he did.

But in 750 his cupidity got the better of him, and his eyes turned toward Tashkent. This was a prosperous city 175 miles northeast of Samarkand – a maker of swords and saddles, bows and quivers, metal products, and fine white cloth. To the court of Tashkent General Kao marched, with show of arms and imperial pomp – and with an overpowering hunger for personal loot. He summoned the king, a Turk who was an acknowledged subject of China.

"You have been found remiss in your duties to the Emperor," said Kao, "and I have come to punish you."

The king was astonished. "*I* remiss? It is the Emperor who is remiss. For years we have been asking our Chinese protector for help. Now, instead of bringing help, you come with threats of punishment."

Kao scowled. "Your arrogant tone does you a disservice."

"Not arrogant, General. I am still loyal to the Emperor and to you as his representative."

"Very well," said Kao. "You are my prisoner. You shall return with me as an offering to the Emperor."

But when the king left his palace, he went in two pieces. And General Kao Hsien-chih, having seen to his decapitation, proceeded to sack Tashkent.

But Kao Hsien-chih had made a serious mistake in neglecting to take the head of the king's son as well as that of the king. The prince of Tashkent escaped and told the story to his neighbors, and the Turkish tribes in Central Asia, at least nominally subject to the conquering Chinese, were furious. So much for the ambassadors and the elaborate presents to the Emperor; so much for the gaudy robes and resounding titles he had sent back.

The Turks appealed to Samarkand:

"The Chinese have done a monstrous thing. Will the Arabs help us?"

Abu Muslim, governor of Transoxiana, received the message with grim satisfaction. He called in Ziyad ibn Salih, a general who had already proved himself an able troubleshooter. "Now," said Abu Muslim, "hunt out that Korean-Chinese and destroy him. The people will be with you."

And at dawn on a July day in 751, Ziyad ibn Salih woke in his camp near the banks of the Talas River, close by the city of the same name. It was a pleasant valley, some 150 miles northeast of Tashkent as the crow flies, but a tough march through the mountains. Here Ziyad ibn Salih's seasoned army of Arabs, Persians, and Turks faced 30,000 Chinese and Turks – the Karluk – under Kao Hsien-chih.

Ziyad made his ablutions, holding out his hands for the water a servant poured from a basin of hand-tooled brass. After performing the ritual of morning prayer, he called in his staff for final instructions.

At first sunlight, with a great waving of the general's flag and of all the corps flags and with trumpets blaring, the army of Islam attacked. Armored bowmen on armored horses; cavalry with spears and javelins; footmen with crossbows and swords. And Kao's men were ready for them.

For five days they met on the banks of the Talas – tearing at each other, retreating, re-forming, and attacking again. Fine Arab horses crumpled in the hail of Chinese arrows and javelins; their riders, springing to their feet, abandoned bows for swords. Infantry on both sides, too close for crossbow work, fell to with swords, daggers, and clubs. Into the sea of battle came Arab camels with soldiers beating cymbals, frightening the horses of the Chinese out of control.

Kao's army was as ferocious as Kao himself. He was a man not used to defeat, but he had already defeated himself. His Turkish forces – the Karluk – inflamed at his treachery in Tashkent, turned on him. The Turks had the fastest bowmen on the most resourceful horses in Asia.

The army of T'ang found itself beset front and rear. Chinese soldiers died by the thousands; other thousands were taken prisoner; the rest fled toward the eastern mountains. With them was Kao Hsien-chih. The road, rough and narrow, was crowded with refugees.

That was the end of China in a corner of the world that is now a part of the Union of Socialist Soviet Republics.

But not the end of the story. For among the prisoners whom Zayid led back to Samarkand were men skilled in a craft that China had practiced for six centuries: the manufacture of paper. Samarkand was blessed with plenty of good water, flax, and hemp, and it wasn't long before the Chinese craftsmen were put to work in the first paper mills west of the Great Wall. From Samarkand their products and their craft spread gradually westward, displacing papyrus and vellum, and in 1389 – perhaps 50 years before Gutenberg developed movable type – the first paper mill in Germany was established in Nuremberg.

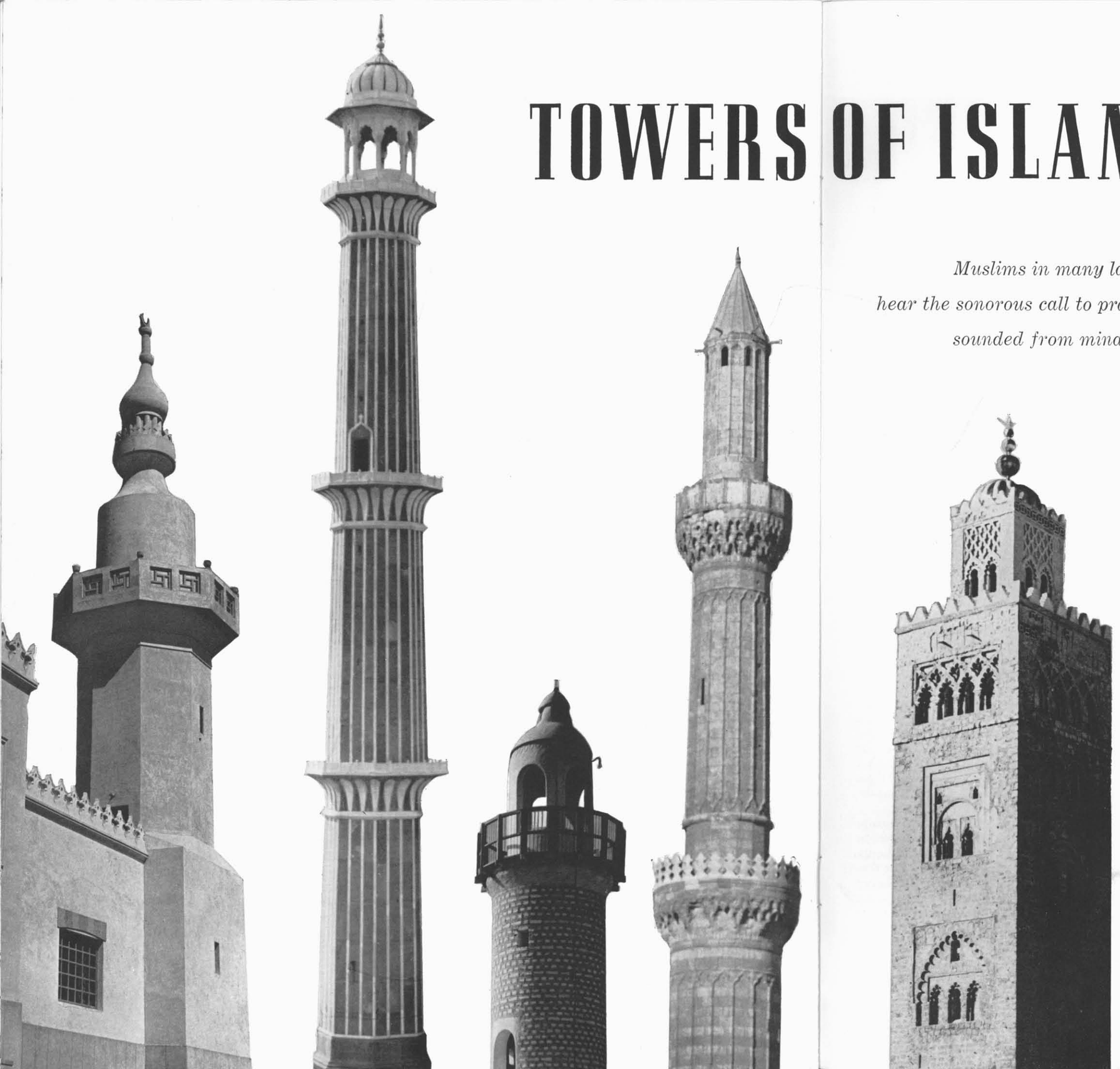
As for Samarkand, that phoenix among cities:

After the Arabs in the course of centuries came the Mongols under Genghis Khan, who destroyed her; and Tamerlane, who made her great again; and the Russians, who took her in 1868. Under the Soviets she was for a time the capital of the Uzbek S. S. Republic.

Today a city of 200,000, Samarkand still deals in silk, cotton, rice, silver and gold, pottery and wines, as she did long ago in the days of Chinese bowmen and the triumph of Ziyad ibn Salih. ■

# TOWERS OF ISLAM

*Muslims in many lands*
*hear the sonorous call to prayer*
*sounded from minarets*



FOR FOURTEEN HUNDRED YEARS the Muslim faithful have heard the call to prayer—"this perfect summons"—issue from the air around them. First it came from a low rooftop a few steps from the simple dwelling of Muhammad, the Prophet, in Medina. Then the sonorous Arabic cadences began to fall from a variety of towers, each of which reflected in its line and proportion the art of those distant places drawn into religious accord by the spread of Islam. Five times each day—at dawn, at midday, in the late afternoon, just after sunset, and during the evening—the voice of the muezzin speaks to four hundred million followers of the message of God brought to the world by the Prophet, calling from the minaret, enjoining the faithful to their duty.

From spare mud towers and roofs in poor villages, and from soaring towers of such magnitude and ornament that men come from half a world away to stand before them enchanted, the holy call is breathed upon the air, and its sinewy cantillation stirs the devout heart in the most labyrinthine byway. Whether it is round, square, polygonal, or a combination of these forms; whether it has only a rude porch or an imposing gallery; whether it is plain or ornate, the minaret is the symbol of Islam.

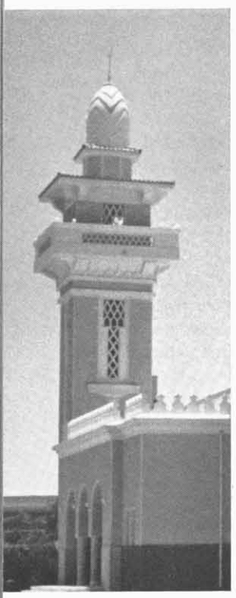
A Christian seeing the slender towers of the Middle East rise in the pale whiteness of the desert light might well assume that the minaret is an obligatory structure in Muslim worship. It is not. K. A. C. Creswell, the leading British scholar of Muslim architecture, has observed that "in the time of Muhammad no such thing as a minaret was known." He dates the first minarets, those at Damascus, from 673 A.D., 41 years after the death of Muhammad. It should be noted that the call to prayer can be cried in the streets or from the roof of the mosque (from the Arabic word *masjid*, meaning "the place of prostration"), and that mosques in villages and outlying places rarely have minarets.

However, the minaret as the setting for the call to prayer now has the force of fourteen centuries of tradition behind it and it would be hard today to conjure the image of a mosque without several towers looming from its corners. The traveler who first is impressed by the *number* of minarets to be seen in large Muslim centers may upon a second, and closer, look be taken by their *variety*. This difference in design and form serves well to illustrate a historic continuum of Islam—unity in diversity.

Although their variations seem endless to the untrained observer, minarets generally fall into one of four characteristic types as isolated by Talbot F. Hamlin of the Columbia School of Architecture.

Those of Cairo and Syria usually have several galleries

Great variety of architectural styles in mosque minarets is shown in minarets in the cities of (left to right) Riyadh, Saudi Arabia; Delhi, India; Hofuf, Saudi Arabia; Cairo, Egypt; Marrakech, Morocco.



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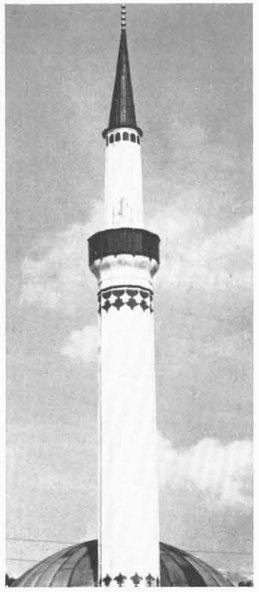

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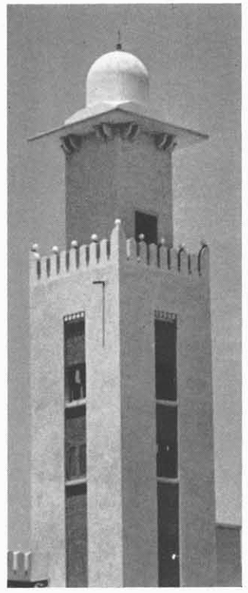

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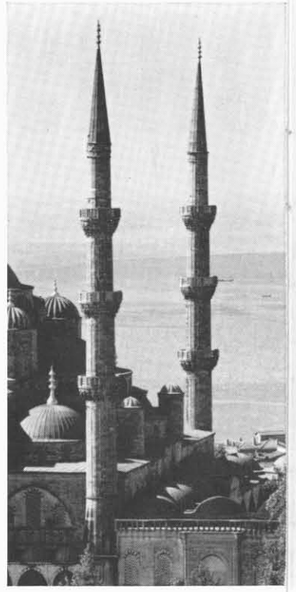

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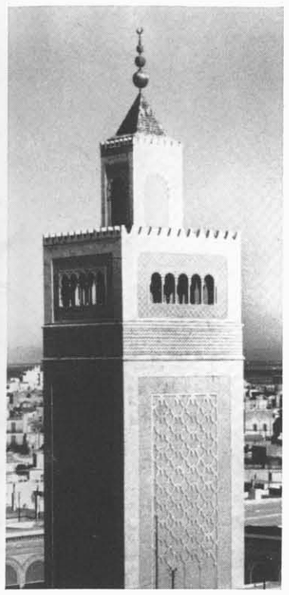

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The culture of each country adds its touch to minaret architecture. **1** Jiddah, Saudi Arabia; **2** Isfahan, Iran; **3** Sarajevo, Yugoslavia; **4** Jiddah, Saudi Arabia; **5** Istanbul, Turkey; **6** Tunis, Tunisia; and **7** Cairo, Egypt.

# TOWERS OF ISLAM

with the tower diminishing at each gallery. The top is capped with a bulbous dome. Sometimes the lowest section is square.

The minarets of Morocco and Spain are generally large square towers, richly decorated, with a smaller pavilion at the top. The usual building material is brick, laid with relief patterns on all sides. The gallery of the lower stage serves for the call to prayer.

The Persian minaret rises in a high, slender, tapered, round turret. Often, pairs of these minarets flank a great entranceway. Usually the gallery is placed very high, and the tower is capped by a low dome. The entire minaret is frequently covered with green, blue, and yellow glazed Persian tile.

The fourth type, the Turkish minaret, is also slender and tapered, and may be round or polygonal. But unlike the Persian minaret, on which it may be based, the Turkish type has two, and even three, galleries. It is uniformly capped with a slim wooden cone. It makes no use of color and is frequently built of white marble.

The minarets of India, while not a distinct type, have impressive elements. They show the influence of native Hindu architectural styles as well as the influence of Persian minarets. Hamlin has noted that "the forms are, nevertheless, treated with that peculiar delicacy and restrained richness typical of Mogul work."

Some insight into the tradition of the minaret can be gained by examining the meaning and use of the word in Arabic. Creswell in his masterwork on Muslim architecture writes: "Three words have been employed in Arabic to denote minarets: *midhana, sauma'a,* and *manara.* The first is derived from *adhan,* the call to prayer, and simply means the place where the call to prayer is pronounced. The second appears to have been the name given by the Arabs to hermits' towers. All Syrian church towers and minarets built before the thirteenth century are square, and in this connection it is especially interesting to find that this word is employed throughout North Africa, where minarets are nearly always of this type. It was carried into Spain by the Arabs and has been incorporated into the Spanish language as *zoma.* The third term, *manara,* literally means 'a place where fire (*nar*) burns.' For this reason it was applied to the Pharos [the historical lighthouse at Alexandria], at the top of which a fire burnt at night, then to lighthouses generally, and then, by analogy, to mosque towers, our word *minaret* being derived from it."

The first use of a tower for the call to prayer appears to have been in Damascus where the early Muslims prayed in the sacred enclosure of a Syrian church which had once been a pagan temple. The first minarets, as such, were constructed when the Mosque of 'Amr was rebuilt and enlarged in 673 A.D. When Islam burst out of Arabia, Egypt was one of the first countries to fall before its epic force. The conquest of Egypt was completed in 640-641 A.D., just eight years after the death of Muhammad. The Mosque of 'Amr was built in 641-642 A.D., and in 32 years the Muslim congregation of Cairo (then, Fustat) outgrew it. Hence, the need for a larger place of worship. The four towers added to the enlarged structure were patterned after the towers of the Syrian church used by the Muslims at Damascus. Creswell, after years of cautious and thorough study, sealed the matter with scholarly care:

"The typical Syrian church tower in pre-Muslim times, especially in the Hauran, the region first conquered by the Arabs, was a square stone shaft, sometimes slightly tapering. . . . We can now say with confidence that the idea of the minaret arose in Syria under the Umayyad dynasty. . . ."

The minaret as a symbol of Islam was secured as early as 707-709 A.D. when the Mosque of Medina was rebuilt and enlarged. This was the mosque built by Muhammad. Four minarets were incorporated in the enlarged structure, and it was panelled with marble and polychrome mosaics, according to contemporary accounts.

Probably the strangest of all minarets still standing is that at Samarra. It is a helicoidal tower standing apart from the mosque and looks like a scaled-down Tower of Babel. An ascending ramp circles the truncated cone just as in the nineteenth-century Biblical, steel engravings of the Tower of Babel by Doré and others. Oddly enough, the Babylonian *zikkurats* (temple towers) were pyramidal and usually built upon a square base. Ascending and continuous staircases ran "round and round" (Herodotus) the outside. The Muslim innovation was to build such a tower (minaret) upon a circular base.

It has been observed that the religion of Islam is not, as some people believe, a profound departure from the other religions which originated in the Middle East—Judaism and Christianity. The three share much in common. As Islam rose and swept from China to Spain, it was far more tolerant of other religions than is commonly understood. Often the conquerors permitted Christian worship to continue while a part of a church was taken over for the obligatory Friday noon congregation prayer of Muslim practice.

One may find a vague irony in the fact that the minaret was adopted from the towers of a building used first for pagan worship, then for the worship of Christ. However, there is a more profound and responsible view which is exemplified in the writings of Kenneth Cragg, a Christian student of the implications in the "call of the minaret" heard five times daily by more than four hundred million people from Morocco to Indonesia.

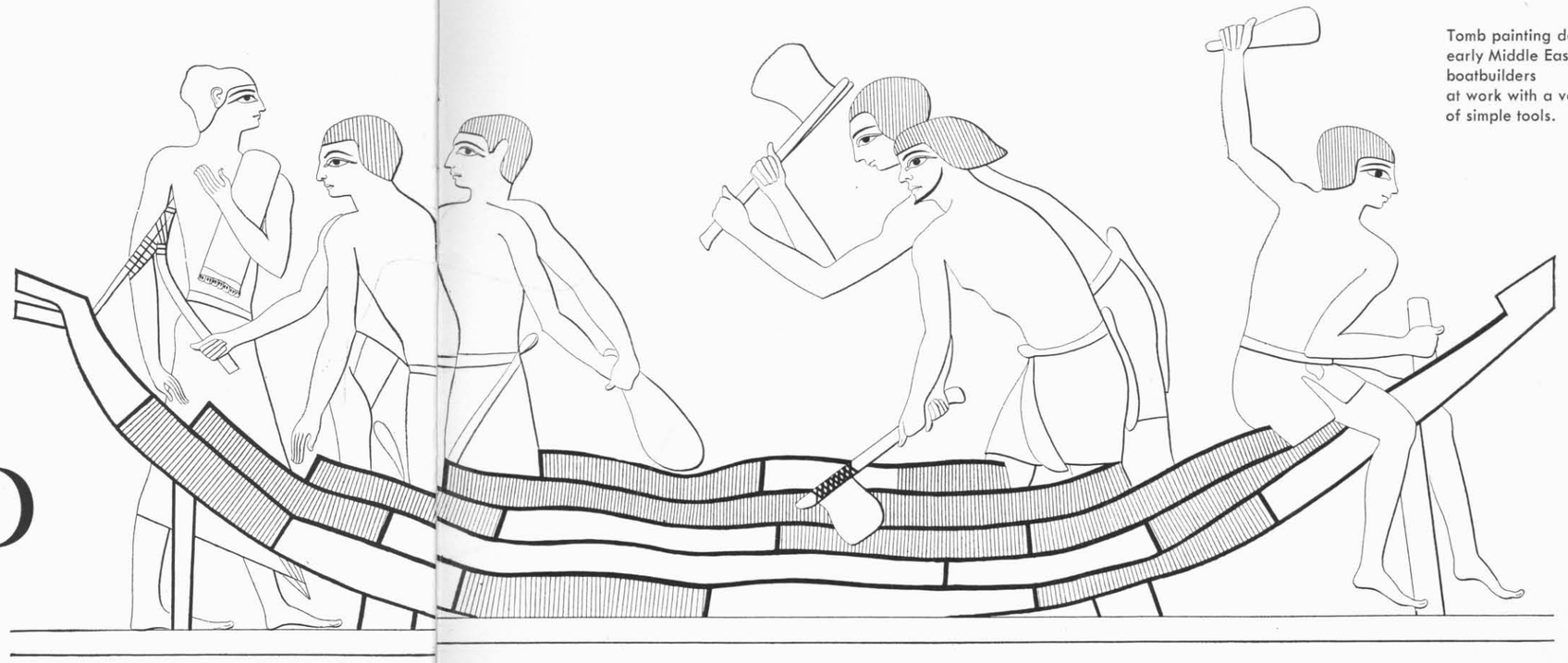
"Two of the most sacred mosques of the Islamic world," Cragg writes, "look down from their sanctuaries eastward toward the trees of old Gethsemane. From its olive-covered slopes the Garden of Agony looks westward to the domes and minarets of the ancient skyline. In the still dawn the muezzin can be heard calling to prayer across the valley where Jesus communed with His spirit until midnight and went forth the Christ of the Cross, the Saviour of the World. Through all their history, since the minarets were raised, the two faiths have been that near, that far."

No less varied than the architecture of the minaret is the cantillation of the muezzin as he calls out (sometimes through a loudspeaker; and sometimes today through the disembodiment of a recording) across the rooftops of thousands of villages and cities. The chant rises and falls with microtonal nuance, the length of phrase may be short or spun out with embellishment, the style may be florid or spare. And the words and phrases may vary or convolve upon repetitions. But the burden of the call is essentially the same from place to place and from prayer to prayer.

Cragg has translated the familiar sentences of the call of the minaret as follows:

> *God is most great, God is most great, I bear witness that there is no god except God: I bear witness that Muhammad is the Apostle of God. Come ye unto prayer. Come ye unto good . . . . Prayer is a better thing than sleep. Come ye to the best deed. God is most great. God is most great. There is no god except God.* ■

# PUTTING THE WIND TO WORK



Tomb painting depicts early Middle Eastern boatbuilders at work with a variety of simple tools.

*Was it on the banks of the Tigris long ago that a youth discovered how to make a boat sail against the current?*

WHERE THE EDGE of the city of Samarra, 70 miles northwest of Baghdad, lay close to the waters of the Tigris, the boy Dejem sat motionless, looking at an object in the river. An idea had just come to him. His eyes, wide with inner imagery, burned with the red reflection of that winter afternoon's sunset in the Middle East of 4,000 B.C.

In the past few minutes a light wind had sprung up to ruffle the surface of the water and raise a little sand dust. But it did something else, something the wind had done for thousands of years – it propelled a floating palm leaf *against* the river's flow.

No doubt this action had been witnessed by many, many people through the vast span of the ages, but Dejem was thinking actively as he watched. He got up and went to the foot of the date palm nearby and picked up a fallen frond. It was big and shiny and strong, with its edges curled in a little toward the spine.

Dejem went over to the edge of the water, loaded the palm with three small stones and set it free on the water's face. The wind still pushed the freight-laden leaf against the current's flow.

The boy looked up and scanned the wide expanse before him. Down the river there traveled a variety of boats and rafts made of wood and goat skins, most of them in search of fish, some taking cargoes to markets downriver. The little vessels would have to be carried by animals and men back upstream after their journeys were over. Dejem thought that a spread area of palm matting or animal skin attached somehow to the boats would enable the sailors to employ the power of the wind to their great advantage. He began to run to his home, aflame with excitement. He wanted to tell his father about it and let that very wise man decide upon its practicality.

Although the story of Dejem is speculation, it is built upon a basis of high probability.

The two Middle Eastern countries of the great rivers – Egypt and Mesopotamia – are generally credited with pioneering in the principles of shipbuilding. Recent evidence tends to give Mesopotamia the lead in this technology.

The progress of the two lands, begun with different ideas, continued along separate lines, no doubt primarily with a view to fishing.

Because papyrus reeds grew in profusion along the banks of the Nile, the early Egyptians began to make boats by tying together three bundles of reeds lengthwise, using one bundle as a keel and the other two as sides.

With no similar wealth of reeds available to the Mesopotamian fisherman, his inventiveness was prompted by other objects that floated down the great river. He observed that drowned goats and other animals floated high in the water because of gas inflation. With strips of palm leaf as thread, he took goat skins, sewed them together to form airtight bags, and inflated them by blowing air into them. This principle of employing air that pushes aside water, enabling man to float at ease, is, of course, the same basic principle in use in today's wooden racing yachts, steel-hulled passenger ships, and nuclear-powered submarines.

While the Egyptian boatbuilder eventually began to employ wood in his craft, his wooden vessels were, for a long time, based on the early reed design. Mesopotamian progress consisted of forming a framework of local woods and strapping underneath it a number of inflated skins. These rafts became capable of carrying extremely heavy loads.

The framework of wood, rather than a complete flooring of planks, was probably dictated by the scarcity of trees, and it was a short step from such a raft to the idea of the framework of the first coracle.

All the evidence points to Mesopotamia as the originator of the coracle, developed there well ahead of any other land. It was a logical progression from the simple skin float to form a skeleton "basket" of pliable wooden staves and over this to stretch an animal hide. The flooring of the coracle – the forerunner of the *quffa* which is still used today on the Tigris – was originally two staves crossed at right angles and bent upward to form the sides of the coracle. These two staves soon multiplied in the design to give a vessel of great