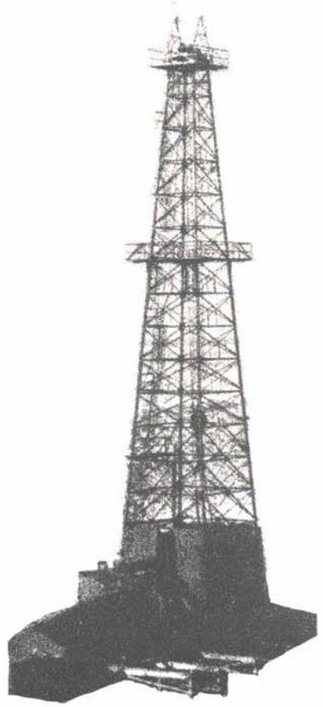
ARAMCO WORLD magazine

# Aramco: a celebration



**"Dig a little bit more..."**

**—Max Steineke**

# Aramco: a celebration

*In this issue of* **Aramco World Magazine**, *we are celebrating the 50th anniversary of the search for Saudi Arabian oil. But we are also celebrating another story: how the sons and grandsons of a developing society came to operate and manage the largest oil producing company in history.*

*The story of Aramco has been told many times. But this time, we have tried to tell it in the words of men who were there: "Bert" Miller and "Soak" Hoover, two of the first geologists to land on the Arabian Peninsula; 'Abd al-'Aziz Shalfan, who joined the pioneer oil men as a boy and was still working for Aramco when he died in 1983; Tom Barger, who became chairman of the board and who has just completed his memoirs; Phil McConnell, who came to Saudi Arabia via an oil boom town in Texas; and Bill Mulligan, who will, perhaps, produce his own complete version of the Aramco story one day soon. Mulligan, only recently retired from the company, based his article for this issue "on documents, interviews, company publications, my own columns in* **The Arabian Sun** *[the company's English-language weekly publication] recollections, reminders from colleagues and my own close-up observations."*

*The same approach was used to develop the Aramco story through the most modern era; we interviewed the men who have seen and helped the company become the giant, complex operation it is today – men like 'Ali Naimi, who as a young Bedouin boy joined the company and who just became Aramco's first Saudi president.*

*In some cases we used intermediaries, but in keeping with the occasion most of the writers, reporters and researchers have, themselves, roots in Aramco: Mary Norton, who, like Mulligan, has written extensively for the* **Sun** *and is an informal expert on Aramco; Lyn Maby, a former writer and editor at the* **Sun** *and a contributor to* **Aramco and Its World: Arabia and the Middle East**, *a publication described elsewhere in this anniversary edition; and Bill Tracy, who went to Dhahran at an early age and later served as assistant editor of this publication for 10 years.*

*Paul Lunde, who wrote "A King and a Concession" and edited the first section "Aramco Then," also has Aramco roots. The son of John Lunde, a former senior vice president of Aramco, Paul Lunde went to Dhahran as an infant, worked in the Eastern Province for two years in the mid-1970's, researched and wrote much of* **Aramco and Its World** *and has been writing for* **Aramco World Magazine** *since 1973.*

*All the contributors, in fact, have previous or ongoing ties with Aramco, Saudi Arabia or the Middle East. John Lawton, who interviewed Saudi executives and helped edit both sections, is a former UPI bureau chief in Beirut and Middle East correspondent and has been a free-lance writer and editor for eight years. John Richard Starkey, who provided the article on Karl Twitchell, once wrote scripts for Aramco training films in Dhahran. And both Arthur Clark and Dick Hobson, who interviewed Aramco executives, are with the company's Public Relations Department in Dhahran.*

*Others who worked on this issue include Burnett H. Moody and his staff, in Aramco's Photographic Unit, who provided up-to-date photo coverage plus research in Aramco's archives; artist Don Thompson, an Aramco Public Relations designer; Brian Smith, an illustrator in the days when the magazine's editorial offices were located in Beirut and designer of the magazine since 1976; and Michael Grimsdale, an artist who is a frequent contributor to the magazine and who produced the maps used in this issue. Such contributions and support were vital in this attempt to tell – much too briefly – the 50-year story of Aramco and to mark this important anniversary adequately.*

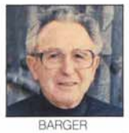
*PAUL F. HOYE, EDITOR*


LUNDE


MABY


TRACY


McCONNELL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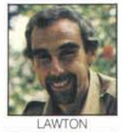
MULLIGAN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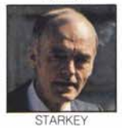
STARKEY


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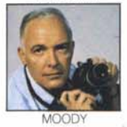
CLARK


THOMPSON


NORTON


MOODY


AMIN

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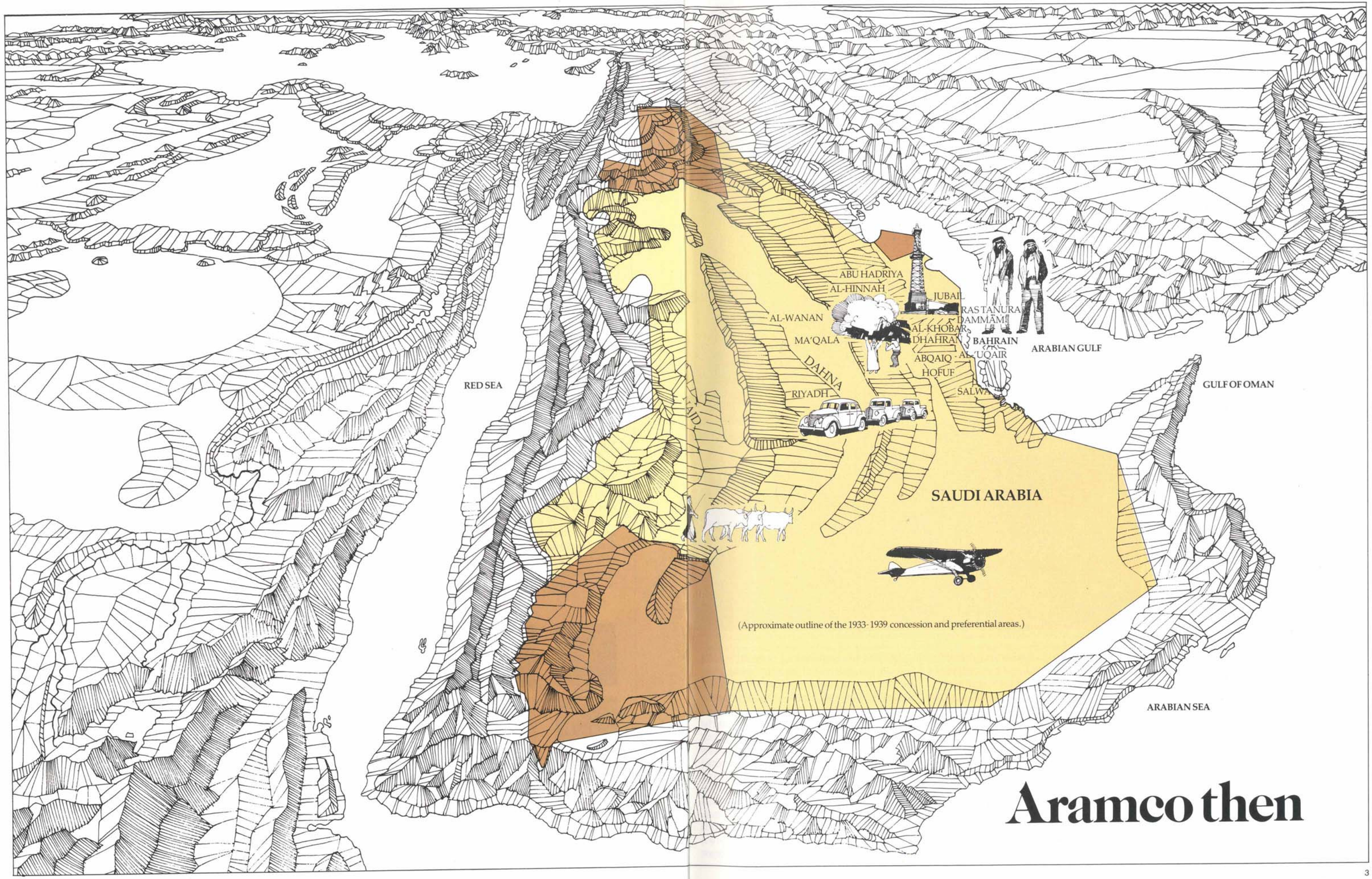
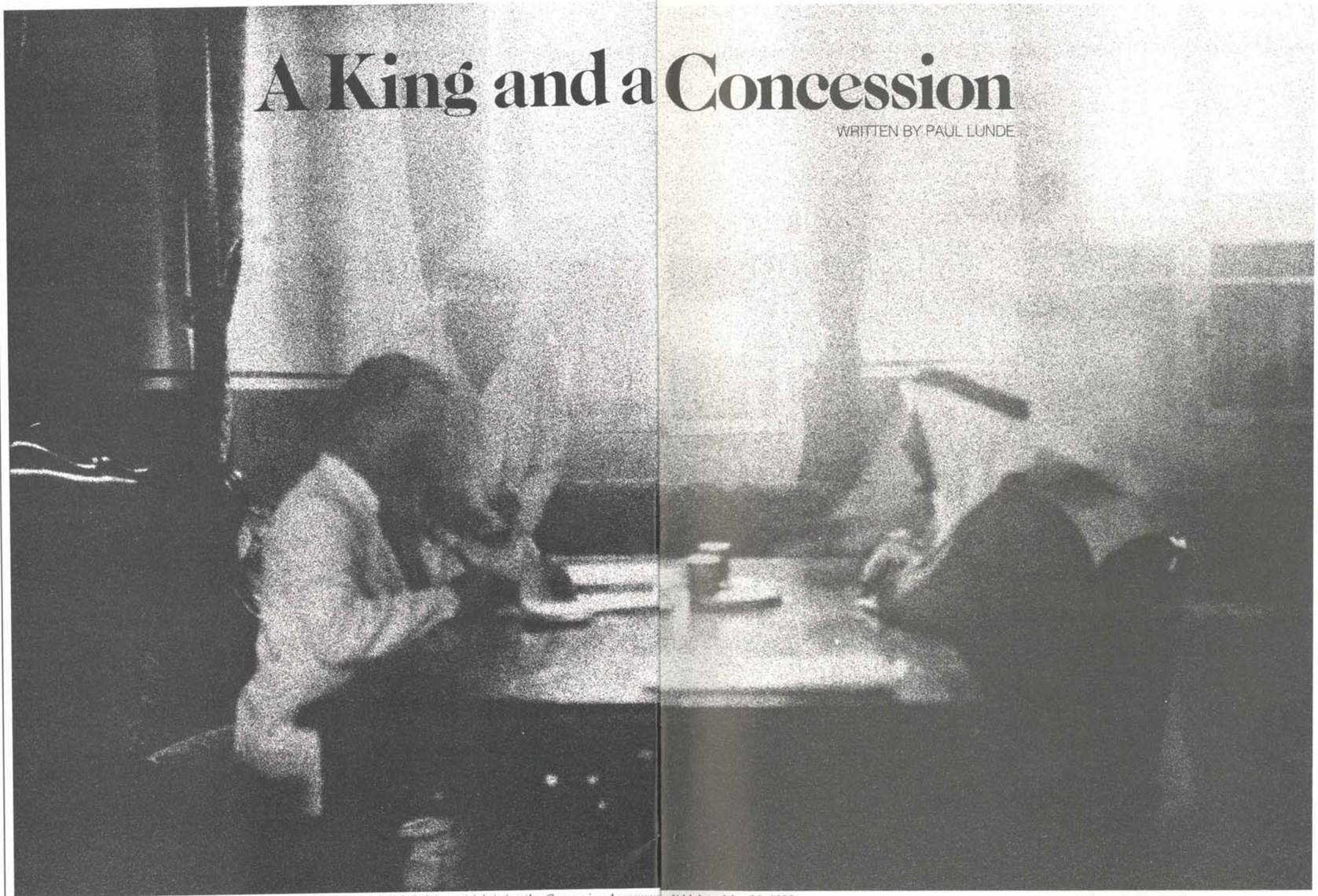

RED SEA
ABU HADRIYA
AL-HINNAH
JUBAIL
RAS TANURA
DAMMAM
AL-WANAN
AL-KHOBAR
DHAHRAN
BAHRAIN
MA'QALA
ABQAIQ
AL 'UQAIR
ARABIAN GULF
DAHNA
HOFUF
RIYADH
SALWA
GULF OF OMAN
SAUDI ARABIA
(Approximate outline of the 1933-1939 concession and preferential areas.)
ARABIAN SEA

# Aramco then

# A King and a Concession

WRITTEN BY PAUL LUNDE



*Socal negotiator Lloyd Hamilton (left) and Saudi Finance Minister Abdullah Sulaiman (right) sign the Concession Agreement in Jiddah on May 29, 1933.*

On September 23, 1933, two American geologists disembarked at the small port of Jubail on the eastern coast of the new kingdom called Saudi Arabia. They had come to open the search for petroleum on the Arabian Peninsula.

The two men – "Bert" Miller and "Krug" Henry – had crossed to Jubail in the Saudi government customs launch from Bahrain, where they had spent the previous year working for the Bahrain Petroleum Company (Bapco), a subsidiary of Standard Oil of California (Socal). They were accompanied by Karl Twitchell, the American mining engineer who had surveyed Saudi Arabia for possible mineral resources on behalf of King 'Abd al-'Aziz; he was also the only American with any first-hand knowledge of the areas where the search would occur: what was called "the concession area."

Specifically, Miller and Henry had been sent to inspect the concession area, most of it in al-Hasa – an area that would in 1956 be officially named the "Eastern Province" – and to look for geological formations that might indicate the presence of oil. Since the concession area measured 371,263 square miles (961,567 square kilometers) – considerably larger than France – this was no small task.

Behind this landing was a complex of historical and commercial developments stemming from British and European efforts to develop Middle Eastern sources of oil. This process had begun in the 19th century, but its first success did not occur until 1901 when William Knox d'Arcy was granted a 60-year concession to look for oil in Iran by Shah Muzaffar al-Din. From this beginning came the discovery of the first commercial oil field in the Middle East by the Anglo-Persian Oil Company (APOC), the first major oil producer in the Middle East. With exclusive concessionary rights over 500,000 square miles (1,294,995 square kilometers) of territory, Anglo-Persian's commercial interests in southern Iran reinforced the long established presence of Britain in the Arabian Gulf.

The demand for Middle Eastern oil was given great impetus on the eve of World War I by First Lord of the Admiralty Winston Churchill's decision to convert the British navy from coal to oil. In 1914 – just two months before the outbreak of the war – the British government bought a controlling interest in Anglo-Persian, thus guaranteeing fuel for the duration of the war.

Britain's interest in searching for and exploiting oil in far-off places is simply accounted for: though the leading industrial nation in the world, she herself had no supplies of this vital substance. But Britain did have far-flung colonies and protectorates, and World War I and the collapse of the Ottoman Empire had increased her role in the Middle East; Arab countries under Ottoman domination were assigned at the conference of San Remo in 1920, as mandates under French and British tutelage. France was given the mandate for the northern half of the old Ottoman province of Syria – now Lebanon and Syria – while Britain was given the mandate over Palestine, Transjordan, and Mesopotamia. Britain also had protectorates in the Gulf, particularly in Kuwait and Bahrain – where the story of the search for Arabian oil properly begins.

In 1922, the Eastern and General Syndicate, a London-based finance group that dealt in oil concessions, was approached by a representative of 'Abd al-'Aziz. The representative, Dr. Alex Mann, had received two commissions from 'Abd al-'Aziz: one to obtain medical supplies in Britain, the other to try to rouse interest in a geological survey of al-Hasa, aimed at finding oil; at that time, there were strong and persistent rumors of oil seepages in Qatif, and although the rumors were never substantiated they did whet the appetites of men and firms dealing in oil concessions. Eastern and General, responding to Dr. Mann's approach, sent a New Zealand promoter named Major Frank Holmes to Bahrain –ostensibly to help develop the island's water supply, but in fact to look for oil concessions.

In Bahrain, Holmes met Colonel H.R.P. Dickson, who had recently served as a British Political Agent in Mesopotamia. Dickson had visited al-Hasa – and had even examined Jabal Dhahran – but had found no trace of the rumored oil seepages.

In the fall of 1922, Holmes crossed to the mainland by dhow and made his way to Riyadh, where he talked to 'Abd al-'Aziz – and was apparently encouraged to continue with plans to obtain an oil concession for Eastern and General. Holmes next turned up in Basra, where he caught a ship for Bahrain. On board, by chance, was Amin Rihani, an American poet and writer of Lebanese extraction who wished to travel in Arabia.

Because his mission was confidential, Holmes was then giving out various explanations for his journeys; he told Rihani, for example, that he was traveling for his health – an unlikely story in those waters – and told Colonel and Mrs. Dickson that he was looking for a rare butterfly – the "Black Admiral of Qatif."

Almost at the same time, an impressive group was gathering in Bahrain. It included British High Commissioner of Mesopotamia, Sir Percy Cox, and Colonel Dickson, on their way to al-'Uqair, on the eastern coast of Arabia, to negotiate with 'Abd al-'Aziz, then the sultan of the Najd, over the boundaries between his territories and Kuwait and Iraq. But meanwhile, Major Holmes had already crossed to the mainland – where, to his surprise, he found Amin Rihani camped at al-'Uqair. Impressed by Rihani's Arabic – and needing help – he showed Rihani a 20-page proposal for an oil concession in al-Hasa which he wished to discuss with 'Abd al-'Aziz – then in Hofuf awaiting the arrival of Sir Percy and his party. Holmes almost immediately set off for Hofuf to discuss matters with 'Abd al-'Aziz.

On November 27, Sir Percy Cox and party landed at al-'Uqair – today nothing but a ruined Turkish customs house and some evidence suggesting that this was Gerrha, said to have been one of the richest cities in the ancient world. The political purpose of the "'Uqair Protocols" – as they were called – was to delineate the northern boundaries of 'Abd al-'Aziz's dominions – incorporating one neutral zone with Iraq and a second with Kuwait – but there were other effects: the ports of Jubail, Qatif and al-'Uqair, which served the exploration parties in the early 1930's, gained importance; one of them, Jubail, is today an enormous port and industrial conurbation.

Colonel Dickson, advised of the arrival of Major Holmes in Arabia, informed Sir Percy that in his opinion Holmes had come "to advise Ibn Sa'ud ['Abd al-'Aziz] on the possibilities of oil in the vicinity of Qatif and Jabal Dhahran." It is interesting to see Jabal Dhahran, later the site of the first oil strike in Arabia, mentioned in the context of the al-'Uqair conference. In fact, Colonel Dick-

THE NEW YORK HERALD

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Nationalist Coalition Gets 52 p.c. of Total As 39,289,884 Ballot

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ROOSEVELT TO AID IN WALSH SERVICE AT CAPITOL TODAY

SITUATION IN HAILS NEW YORK EDITOR TELLS LONDON PRESS

Bank Holiday Now Prevails In All States; Calm Follows

Nation 'On Call' – Everybody's Credit Good

son, on an earlier visit to al-Hasa, had been shown a copy of a Turkish report on an oil seep near Qatif; it must have been written before the Turks were expelled from the region.

On the last day of the al-'Uqair conference, 'Abd al-'Aziz mentioned the possibility that he might grant an oil concession to the Eastern and General Syndicate. At first, Sir Percy recommended that he do so, but on reflection suggested that he wait until the British government had been consulted. Then, however, after the signing of the Uqair Protocols, Amin Rihani – who had followed 'Abd al-'Aziz to Riyadh, and was now on friendly terms with him, pointed out to 'Abd al-'Aziz that he was under no obligation to ask the British government's permission to dispose of the mineral rights in his territories. 'Abd al-'Aziz agreed, but felt constrained by the fact that he did not wish to lose a subsidy from Great Britain in exchange for a meager £2,000 yearly rental of an oil concession in al-Hasa that, after all, might not contain any oil.

In April, 1923, Rihani ran into Holmes still again, this time in Baghdad, and found that Holmes had heard nothing from Riyadh. Rihani urged him to go back to Arabia and speak once more to 'Abd al-'Aziz. Holmes took his advice and this time the concession was granted – partly because the British government that year ended its subsidies to Gulf rulers. As *The Times* reported on May 21, 1923:

> The *Baghdad Times* announces that Mr. Frank Holmes, on behalf of the Eastern General Syndicate (sic), has obtained from Ibn Sa'ud, the sultan of Nejd, a valuable concession for an area of four thousand miles (*sic*) in the province of Hasa. The concession covers three hundred miles of the coast of the . . . Gulf . . . I understand that the contract gives Ibn Sa'ud a fifth of all profits and, should the field prove rich, Ibn Sa'ud proposes to utilize the revenues in organizing Hasa as a separate province on modern lines.

This report was at once prophetic and premature. It was to be some time before 'Abd al-'Aziz's plans for the development of the country could come to fruition since granting an oil concession is one thing, finding oil another – as Major Holmes was to learn. Holmes' success in obtaining an oil concession in al-Hasa was quickly followed by two more, one in Kuwait in 1924 and one in Bahrain, both on behalf of the Eastern and General Syndicate. The syndicate sent exploration parties into al-Hasa in 1923 and paid the concession rental in 1924. But despite the possibility that the concession would lapse, Eastern and General did not pay in 1925, and the concession lapsed – a concession that included almost all the incredibly rich oil fields later found and developed by the Arabian American Oil Company (Aramco).

The focus of the early history of oil in the Gulf now turns to Bahrain. Major Holmes, with concessions in Kuwait and Bahrain, now had to interest someone in exploring those concessions. He approached a number of oil companies,but failed to interest any of them in drilling in Bahrain – until he got in touch with Eastern Gulf Oil – which bought Holmes' Bahrain concession for $50,000, then discovered, because of its association with the Iraq Petroleum Company (IPC), that it was barred by the famous "Red-Line Agreement" from developing oil in Bahrain.

The 1914 "Red-Line Agreement" was an agreement by the various participants in the Turkish Petroleum Company – including the British and German governments, the d'Arcy group and others – not to engage in the production or development of oil in the territories of the Ottoman Empire except through the Turkish Petroleum Company.

Since IPC was the successor to the Turkish Petroleum Company, and since Eastern Gulf was associated with IPC, Eastern Gulf was also forbidden to operate in Bahrain. Eastern Gulf, therefore, offered the Bahrain concession to Socal, which, as an American Company, was not bound by the "Red-Line Agreement."

At that point, Socal could have easily refused the concession. In the United States, oil was plentiful and cheap; in Texas it was selling for 10 cents a barrel. Furthermore, Socal had spent millions on exploring in a number of countries – but had drilled more than 30 dry wells in places as far afield as Latin America, Alaska and the Philippines. Nevertheless, Maurice Lombard and William Berg, Socal directors, decided to check out the findings of geologist Ralph Rhoades, who had surveyed Bahrain for Eastern Gulf in 1927. First, though, Socal had to register a Canadian company as a subsidiary, to comply with a British law forbidding non-British registered companies to operate in the area. Thus was the Bahrain Petroleum Company (Bapco) formed, and on August 1, 1930, the Bahrain concession was formally assigned to Bapco – whose chief local representative was none other than Major Frank Holmes, now known in the Gulf as *Abu al-Naft*, "Father of Oil."

*King 'Abd al-'Aziz, and left to right: Yusuf Yasin, the king's secretary; Hafiz Wahba, one of the first Saudis elected to Aramco board of Directors; Prince Faisal and unidentified official.*

What Rhoades had found was a classic dome formation on Bahrain, and Socal geologists Fred A. Davies and William F. Taylor agreed that it was worth drilling. Looking across the Gulf at the coastline of al-Hasa, they also decided that the low range of hills on the mainland might repay examination – and urged Major Holmes to arrange a meeting with 'Abd al-'Aziz. But Holmes was unwilling or unable to do this, so Taylor and Davies left Bahrain without having had a chance to examine al-Hasa.

Another important character in the search for Arabian oil now took the stage. This was Harry St. John Philby, who had lived in Jiddah since 1925 and was the leading European authority on the country. A close friend 'Abd al-'Aziz, his finance minister Abdullah Sulaiman and Fuad Hamza, the deputy foreign minister, Philby introduced 'Abd al-'Aziz to the American philanthropist Charles R. Crane.

An unusual man, Crane had inherited a fortune from the manufacture of bathroom fittings and dedicated it to helping develop Arab countries. As a member of President Woodrow Wilson's King-Crane commission – set up to assess the future of the Middle East – he had recommended the self-determination of the Arab peoples as early as 1919. Philby spoke of Crane to 'Abd al-'Aziz, to whom he urged the necessity of foreign capital and expertise to develop the mineral resources of the country. As a result, 'Abd al-'Aziz invited Crane to Jiddah.

Since Jiddah at the time had no piped water supply, Crane offered to lend 'Abd al-'Aziz an engineer who worked for him named Karl Twitchell, who was at that moment in Yemen. Twitchell arrived in Jiddah in April and busily set about studying the city's water supply. He also traveled widely in the Hijaz looking for water – and any mineral deposits that might be commercially exploitable.

In 1931, the Arabian Peninsula had been severely affected by the world depression: the main source of income in the Hijaz had traditionally been from the Hajj and the world depression meant that fewer and fewer Muslims could afford the expensive journey to Makkah (Mecca). In inviting Crane therefore, 'Abd al-'Aziz was hoping to discover new sources of revenue at a time when the economic outlook could not have been blacker.

Towards the end of May, 1931, the month the United States recognized "The Kingdom of the Hijaz and its Dependencies," – which included the Najd and al-Hasa – Twitchell reported to 'Abd al-'Aziz on his search for water in the Hijaz; it was a discouraging report, but 'Abd al-'Aziz asked him to continue his work – this time in al-Hasa.

Twitchell left Jiddah for al-Hasa on December 13, 1931 – shortly after the first oil well had been spudded in on Bahrain. On January 12, 1932, he met 'Abd al-'Aziz in Hofuf and made a preliminary report. 'Abd al-'Aziz asked Twitchell to arrange for "oil geologists and oil-well drillers," but Twitchell recommended that nothing be done until the results of Jabal Dukhan 1 on Bahrain came in, because, he told 'Abd al-'Aziz, the same geological formations obtained in Bahrain and eastern Arabia. Although not strictly true, this did convince 'Abd al-'Aziz of the wisdom of a wait-and-see policy.

On May 31, 1932, four months after Twitchell's conversation with 'Abd al-'Aziz, Bapco struck oil in commercial quantities at Jabal Dukhan 1 at a depth of about 2,000 feet (610 meters). But even before this momentous discovery, Socal executive Francis B. Loomis had got in touch with Philby – then in London lecturing to a variety of learned societies – and had arranged a meeting to discuss the possibility of an oil concession in the kingdom. The two men met over lunch at Simpson's in the Strand on July 11, and Loomis asked Philby whether he thought there was any chance of obtaining a concession. Philby said he thought the chances were good, but that such a concession would not come cheaply. "I told him," said Philby, "that I would be glad to help in any scheme which would contribute to the prosperity of Arabia."

Meanwhile, Karl Twitchell was in America making the rounds of the oil companies in an effort to interest *them* in an Arabian concession. Twitchell conferred several times with Loomis and met Maurice L. Lombardi of Socal, who expressed interest and realized that Twitchell was an excellent contact with the king. He therefore authorized Twitchell to represent Socal, along with Lloyd Hamilton as lawyer and negotiator.

On December 3, 1932, Philby returned to Jiddah, where he found a cable from Loomis reiterating Socal's interest in "... making geological investigations in Arabia. In particular we would like to obtain exclusive right to examine Hasa and neutral territories lying between Kuwait and Qatar Peninsula, and the territory lying inland adjacent thereto. Then, if geological indications seem favorable to us, we contemplate a concession for exploration for petroleum, to be followed by lease for producing petroleum, if found in sufficient quantities. Will you not kindly ascertain His Majesty's reaction to this proposal; and, if favorable, we desire your suggestions as to what steps we should take to obtain permission to do this preliminary geological work and your assistance in car-

rying them out." Philby cabled back from Makkah on December 22, telling Loomis of the government's urgent need of funds, and making clear that any granting of a concession would require a substantial *quid pro quo*.

Philby's role in the negotiations now became even more critical, for he took it upon himself to approach a friend who worked for the Anglo-Persian Oil Company; in a letter dated December 17, 1932, he informed his friend of Socal's interest in obtaining a concession, and suggested that Anglo-Persian might be inclined to make an offer too. "My main object," he added, "is to get the concession going in the interests of the Government." Philby saw that the best way to get the best price for the Saudi government would be by getting the various companies to bid against one another.

Philby wrote to Loomis again in mid-January, seeking to keep Socal's interest in bidding for the concession alive. He told him that Anglo-Persian was carrying out a survey of the Qatar Peninsula, and added that he himself had noted a Miocene deposit "running inland for a considerable distance between Salwa... and Yabrin. This probably underlies a good part of Hasa, along the coast of which, between Ras Tanura and Jubail, Twitchell... discovered substantial oil seepages." Twitchell later stated that he had no recollection of seeing any such seepages, but the persistent rumors of them certainly served to concentrate interest on this area. Philby also told Loomis that he had heard that Twitchell was expected to arrive in Jiddah in February on behalf of an unknown American oil company; he was unaware at the time that Twitchell was a second string to the Socal bow. He found out the true state of affairs when Lombardi cabled that Twitchell and Lloyd Hamilton were scheduled to arrive in Jiddah on February 15 to discuss the concession with the government. At almost the same time, he heard from Anglo-Persian that they too were "definitely in the bidding for the Hasa." The stage was set.

At this time, Philby was not on the payroll of any of the negotiating parties. In his account of the negotiations, however, he candidly states that he had a basic preference for the Americans, because, as their record in Bahrain showed, they had no imperialistic ambitions. Other than that, he would favor the highest bidder, in an effort to obtain the best possible deal for the government. His influence, of course, was only that of intermediary; the negotiations themselves were carried out by the Saudi ministers.

Twitchell and Lloyd Hamilton arrived in Jiddah as scheduled on February 15, 1933. Hamilton soon indicated to Philby his willingness to make a substantial loan to the government – he mentioned the figure of £50,000 in gold – and although Philby thought this too low, it was an encouraging sign. Hamilton also asked Philby to work on behalf of Socal, and Philby agreed, accepting a payment of $1,000 a month for a minimum of six months, "with substantial bonuses on the signature of the concession,

*Saudi Finance Minister Abdullah Sulaiman.*

and of the discovery of oil in commercial quantities." He was now committed to the American camp. He was also approached by the British, who told him that their negotiator, Stephen Longrigg, of IPC, was due to arrive in Jiddah in March. When Philby met him, he got the definite impression that the British were not particularly serious about winning the concession; they already had extensive commitments in the Middle East, and thought the price too high.

Meanwhile, Hamilton and Twitchell had talks with Abdullah Sulaiman, and some initial terms had been debated. The government still thought the amount offered by the Americans too little, and the patient minister of finance continued to hold out for more. Philby told Abdullah Sulaiman that he thought the Americans would not go above a figure of £50,000 – rather than the £100,000 the government wanted – and that some of this would almost certainly be in kind, not cash. In the various talks that went on at this time it became apparent that IPC, the British representatives at the negotiating table, were interested in exploration rather than development, and this fact alone was enough to disqualify them in the eyes of the government, which was anxious that development should follow hard on the heels of discovery.

On April 10, a new factor was momentarily added to the already complex situation: Major Frank Holmes arrived in Jiddah. Rumor of his arrival had preceded him, but it turned out that he had no serious proposals to make, other than that the three competitors join forces. He left the following day, leaving the field to Hamilton and Longrigg.

Philby had understood that Hamilton, on behalf of Socal, was prepared to offer a loan of £50,000 in gold, a £5,000 yearly rental, also in gold, and a royalty of four shillings a ton on production. He was astonished, and the Saudi government dismayed, when the Socal directors made an offer of a loan of $100,000 – about £20,000 – a yearly rental fee of $20,000, and reserved their position on minimum royalty. The Saudi government responded to this offer by asking for a loan of £100,000 in gold, £30,000 gold yearly rental, 3,000 tons of free oil yearly, and a £200,000 gold guaranteed annual royalty.

On April 21, Hamilton, after consultation with his principals, to whom Philby had also communicated his views with his usual prolixity, made a formal offer to the Saudi government: an initial payment of £35,000 in gold, £5,000 rental for the second year of the concession, a second loan of £20,000 at the end of 18 months, and a rental of £5,000 for the concession area beginning in the third year, plus a £50,000 loan in gold upon discovery of oil in commercial quantities and a further loan of £50,000 a year later. He also agreed, on behalf of Socal, to commence operations in September, 1933 – the beginning of the cool season – and undertook to begin drilling as soon as a suitable structure was found, and to continue doing so until oil in commercial quantities was struck.

Longrigg had been given until May 2 to come up with a counter offer, but he told Philby that he was empowered to offer at the most £5,000; this was clearly too little, and IPC was out of the picture.

Just as it looked as if agreement could be reached, the worrying news reached Jiddah that the United States had departed from the gold standard. This meant that it was going to prove difficult to make the initial payment, which the contract stipulated must be in gold.

The finishing touches were made to the draft agreement, nevertheless, and on May 8 it was forwarded to the king. It was read out to him, and at the end he said, turning to Abdullah Sulaiman, "Put your trust in God, and sign." The Concession Agreement was signed in Jiddah by Lloyd Hamilton and Abdullah Sulaiman on May 29, 1933. On July 7, 1933, royal decree number 1135, "granting a concession for the exploitation of petroleum" was signed and published in the official gazette July 14.

The negotiations for the concession had taken three and a half months of hard, patient bargaining, and now final agreement had been reached. Hamilton left for London, where he immediately took steps to ensure early compliance with the agreement: he arranged for Twitchell, who was still in Jiddah, to cross the peninsula with two cars and two trucks, to help the first geologists who would come by launch to al-Hasa from Bahrain; he started looking for an airplane to help in the reconnaissance of the country and asked Philby if he could lease his house, the Bait Baghdadi, as the Jiddah headquarters of the company.

To circumvent the embargo on gold, Hamilton also arranged for 35,000 gold sovereigns to be shipped to Jiddah from London. They arrived in Jiddah towards the end of August, 1933, and were counted in the Nederlands Bank by Twitchell and Abdullah Sulaiman.

When the geologists Miller and Henry landed at Jubail on September 23, 1933, therefore, they were ready to go. Accompanied by Karl Twitchell, they immediately drove over to look at Jabal Berri and five days later inspected Jabal Dhahran. By June 6, 1934 they had completed their survey of the Dammam Dome, and in the spring of 1935 the first well was spudded in. Encouraging signs of oil were found – the well was producing about 100 barrels per day on September 18 – more wells were drilled and, on December 7, 1936, Dammam No. 7 was spudded in; it came in in March 1938, and in the fall of that year, when it was established that oil in commercial quantities had been found, the king was informed of the good news. Saudi Arabia was in the oil business.

## Twitchell: "...Who lifted the lid on Saudi Arabia's treasure..."

WRITTEN BY JOHN RICHARD STARKEY

*"A tough Vermont Yankee" to journalists, "the epitome of an engineer" to his son and a man for whom "everything had to be on time, right away" to his wife, Karl Twitchell, to those who worked with him, was also a man notable for his energy, enthusiasm and integrity.*

*Trained as a mining and civil engineer in the United States, Twitchell, in 1931, was abruptly pitched into the Arab East by his employer Charles R. Crane and by 1933 was participating in painstaking negotiations with the government of Saudi Arabia – negotiations that led to the granting of the oil concession in al-Hasa to the American oil company that later became Aramco.*

*Earlier, Twitchell, accompanied by his wife Nora – now in her 80's – had spent six years on the Arabian Peninsula as the result of a chance meeting. "My husband had to stop in Aden to get a steamer to England," recalls Nora. With time to kill, Twitchell went to the American consulate and met the vice consul, who gave Twitchell a letter of introduction to Crane, heir to a plumbing supply fortune.*

*To Crane, then trying to help with the development of the Arabian Peninsula, Twitchell was just the man he was looking for. In 1927, Crane sent Twitchell to Yemen where he built "the only steel-truss highway bridge in Arabia." A 122-foot steel bridge (37 meters), it was erected with Yemeni labor in only 19 days. Then, in 1931, Crane, having met 'Abd al-'Aziz, asked Twitchell to come to Jiddah where he checked existing and potential water sources, then set out on a 1,500-mile expedition to the north (2,400 kilometers). The parched terrain away from the coast made a strong impression on his wife Nora: "It was extraordinary... There was no sign of life. There wasn't a blade of grass. There was nothing – not even an ant. And sheer silence."*

*In the fall of 1931, Twitchell again directed his attention to water resources in and around the Red Sea coast; in November, he reported to the Explorer's Club in New York that he was "at present directing the work on a freshwater supply for... Jiddah," [and] by the end of 1931, had repaired the 60-year old terracotta piping and water tunnels that fed water to the city and erected a 16-foot diameter windmill (4.88 meters) with auxiliary engine and pump-jack. The windmill raised some 40 gallons of water per minute and fed it into the water tunnel, through which it flowed the seven miles to Jiddah. But then, even before the project was completed, 'Abd al-'Aziz asked him to go to al-Hasa – 1,000 miles across the peninsula (1,600 kilometers) – to report on water sources and oil possibilities.*

*Twitchell visited Bahrain and confirmed that the drilling of the first oil well would soon be completed. He gave this information to 'Abd al-'Aziz in January, 1932, and when news of the oil strike there reached 'Abd al-'Aziz in June, he asked Twitchell, according to Mohammad Almana, an interpreter at 'Abd al-'Aziz's court, "to form a national oil company for the Saudi Government." Twitchell declined, but did agree to approach American mining and oil companies on behalf of the Saudi government. He eventually got to see a Socal director, Maurice L. Lombardi who had had his eye on al-Hasa since the late 1920's and immediately saw that Twitchell was valuable: he knew 'Abd al-'Aziz personally. Complex negotiations lay ahead, of course, but at the end of three and a half months of hard negotiating, a 60-year concession agreement was signed.*

*Twitchell continued to serve Saudi Arabia for another 20 years – organizing the Saudi Arabian Mining Syndicate, and serving as chief of the first U.S. Agricultural Mission to Saudi Arabia, organized at the king's request. Mission members, after visiting 74 different areas, were the guests of the king at a feast, along with Alexander Kirk, the first American Minister to Saudi Arabia, at which the king demonstrated both his superb tact and his loyalty to Twitchell.*

*When he entered, he took the throne, motioned Minister Kirk to sit on his right with Secretary Hare and other members of his military mission. But a large overstuffed chair was brought and set exactly opposite the king who told Twitchell to sit down and, turning to Mr. Kirk, explained that this seat was for his old friend Twitchell. "By this gesture was protocol observed and friendship satisfied," Twitchell wrote.*

*When Karl Twitchell died at the age of 82, he was eulogized in an official Saudi publication as the man "who first lifted the lid on Saudi Arabia's treasure box of natural riches" – but the process of rapid growth and modernization that he helped set in motion is probably his most enduring memorial.*

# Footsteps in al-Hasa

WRITTEN BY LYN MABY

"*All's well that ends well*," wrote J.W. "Soak" Hoover on April 12, 1934, "*but my eyes are tired from looking so much and so far.*"

The third American geologist to step ashore in eastern Arabia, then called al-Hasa, Soak Hoover is a good example of the "uncommon individuals who were in the right place at the right time with precisely the right combination of fearlessness, perseverance and optimism," as the dedication page to his album of Arabian photographs states. And, although Hoover, now 80, emphatically denies that the first geologists in Arabia had any sense of history – to him they were ardent and dedicated field men simply setting out to do a job the best way they knew how – his diary, in which he put the above comment, and his photographs present a historically interesting record of the early days of oil exploration in Saudi Arabia. One photograph, for example, recaptures the heroic age of Arabian exploration: the 19th century. It shows the amir of 'Unayzah, 'Abd al-'Aziz 'Abd Allah al-Sulaym, who was the host of the great British traveler Charles Doughty, author of *Arabia Deserta*, when he visited that town in 1880.

In October, 1933, one month to the day after pioneer geologists "Bert" Miller and "Krug" Henry landed at the small fishing village of Jubail, Soak Hoover disembarked some 100 miles south (160 kilometers), at al-'Uqair, site of the boundaries conference between 'Abd al-'Aziz and Sir Percy Cox in 1922. With him came the first three automobiles ever landed on the eastern coast of Saudi Arabia.

Hoover's journey to Saudi Arabia had been a long one. He had left New York on the *S.S. Rotterdam* on September 15, gone to Paris, boarded the Simplon Orient Express and traveled to the end of the line – Mosul, in Iraq. There, he and his companions were met – in Rolls Royce touring cars – and taken to a point where they could pick up the Baghdad railway and make their way to Basra. In Basra, Hoover boarded the *S.S. Baroda* and sailed to Bahrain via Kuwait and Bushire, a port in southwest Iran, where he marveled at passengers boarding for Bahrain, hooded falcons on their wrists. In his diary, Hoover noted that "*The talk of the captain and the mate make it seem as though the Gulf is just one big community.*" This certainly seems true; reading any document or memoir of the time you see that the same names crop up over and over.

In Bahrain, Hoover collected the three 1932 Ford touring cars that he was to take to al-Hasa. He had heavier springs and bigger tires – the biggest obtainable – put on for desert travel and then, with Walt Haenggi, a rig-builder for Socal, set about adapting a dhow to take the unusual load. "The crew – I think they were Persians – couldn't talk to me, and I couldn't talk to them," recalled Hoover in a 1983 interview. "I tried to get them to put the longest timbers across the middle of the boat where it was the widest, but they wanted to start at the bow, cutting off each timber, first one end, then the other. They wasted a lot of lumber and in that part of the world lumber is hard to come by, or so Haenggi informed me. He had a wonderful vocabulary, and he could really tell you things."

In preparing for the crossing, Hoover provisioned himself with a canteen of water and a couple of sandwiches – fortunately, as it turned out. "I didn't know how long it was going to take, and then out in the middle of the water the wind died, and we sat becalmed all night. Every once in a while a child would come up out of the hold and throw things at me and everyone would laugh . . . I couldn't talk to them and they couldn't talk to me . . . I had no map and didn't know where in the world I was. Finally the wind came up about daylight, and we could see al-'Uqair. Krug Henry and Bert Miller were right there at the customs house and they didn't even come down to help me! I've often wondered why, but what bothers me more is that I never did ask them why they didn't!"

The day after Hoover's landing at al-'Uqair, he and Henry set up camp, as he said in his diary: *Thursday, October 26, 1933: Henry and I built a bathhouse, put up fly for dining salon. Entirely remodeled kitchen tent . . . I stepped on the cook's egg cache, broke a dozen or so . . . he buries them in the sand to keep them fresh . . . also visited and photographed the camel corps . . . the camp owl returned before bedtime.*

In addition to these "housekeeping" activities, Hoover and Henry started a preliminary investigation of the structure later named the Dammam Dome: *Tuesday, October 31, 1933: . . . measured two sections, one behind camp, one on Travertine Jabal, and we couldn't correlate same. Late in afternoon we found a very pronounced syncline striking out about NW-SE . . .* Sixteen days later, on Sunday, November 16, he noted: *. . . finished trinet on the fourth sheet and resected a Nummulites point on the west rimrock . . . took pictures of unconformity at hemispherical bed and more from Midra Shamali . . . the soldier climbed the jabal and spent his time calling to a hawk . . .*

The geologists did not travel alone. As required by the Saudi Government, each field party was accompanied by up to 30 escorts, whose function, in part, was to show the local people that the geologists had the king's permission to move and work where they needed to. There were also cooks, mechanics, and, when the parties were on the move, camel drivers and

attendants. Typically, a party would contain about two dozen riding camels and a dozen baggage camels, each able to haul some 400 pounds of tents, collapsible tables, chairs, camp beds, ground matting, lamps, cooking gear, spare tires and extra springs for the cars, as well as food for everybody.

As the first season got under way, two more geologists arrived: Art Brown and Tom Koch, and all five went to visit Hofuf, the main town in the al-Hasa oasis, where Allen White, an engineer and the group's first Arabist, would soon establish the venture's first field office. Hofuf was Hoover's first experience with a town in the interior:

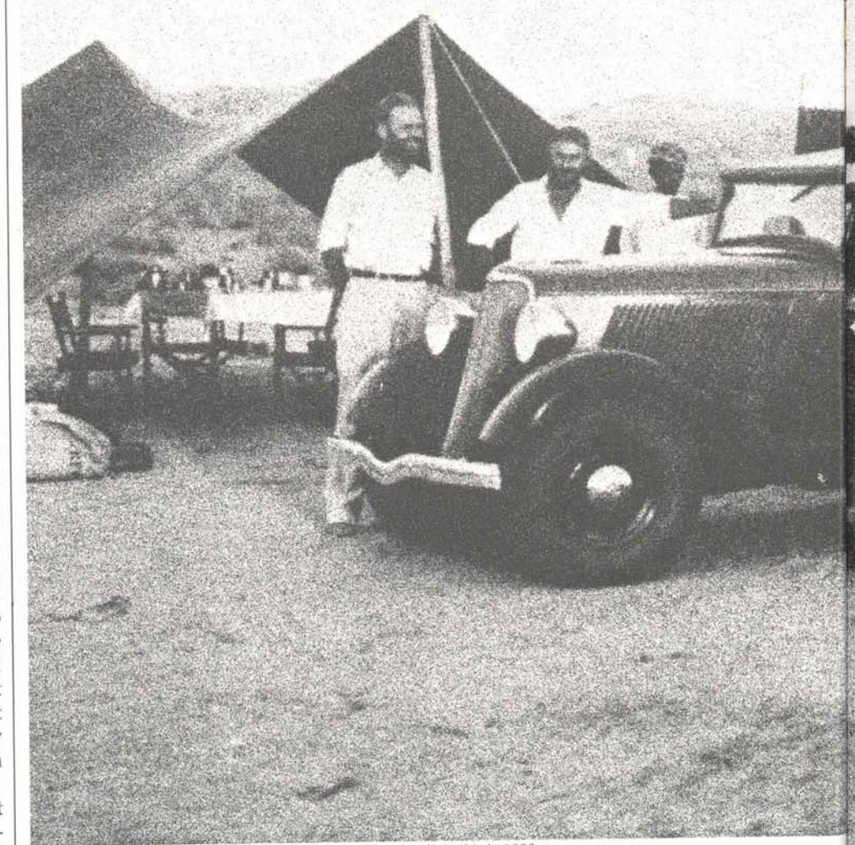
"Hofuf was the most interesting town you ever saw in the nighttime," he recalled. "It's a very old town, and then it still had three walls around it. There were no lights. At night when it was dark, and when somebody asked us to dinner, they'd send a messenger with a couple of kerosene lanterns to guide us. With the walls . . . and those narrow streets . . . it was dark as the inside of a cow. We were in a different land."

In November, 1933, a new geologist named Hugh Burchfiel came and was set to work mapping the country west of Jubail, a town which soon came to be seen as a better base of operations than Hofuf. Soon Hoover and Krug Henry joined him there in a walled compound rented from the prominent al-Gosaibi family. Allen White stayed in Hofuf where he acted as the company's liaison with the Saudi government. A typical entry in Hoover's diary for this period reads: *Wednesday, January 10, 1934: Jubail . . . ran an auto traverse from Jubail to some point west and probably south of Qatif on proposed road around for the trucks. Tonight we found cinnamon in all the food; asked the cook to put in apple pie . . .*

Apple pie was unusual. As Hoover says: "Of course we ate mostly from cans in those days, especially in the field camps. Sometimes they sent food out to us by caravan from Jubail, and sometimes it got too ripe, even in cans, along the way. Occasionally a field party might buy a sheep from a passing Bedouin for the going price of about a dollar and a half. Once in a great while we'd shoot a gazelle, or take a hawk and try to catch a *hubara*, a kind of bustard, or maybe catch a *dabb* [the large, spiny-tailed lizard whose tail is regarded as a delicacy], but you can't just clean them with a knife. What you do is throw them in the fire, and they swell up and burst, and then you can clean them."

In February, 1934, Hoover and Henry left Jubail to examine the area around al-Hinnah. "Most of the village came out to see us off as Krug and I left Jubail to go back into the desert. We started working on the coast . . . took what we called the 'mean sea level' and went inland as far as a little town named al-Hinnah. We had two chronometers, I remember, because when we started shooting the stars we wanted to be right on the money . . . it was my chore to wind one up just at sunset so we'd know the time in London." *Wednesday, February 14, 1934: al-Hinnah camp. We visited Jabal Batil . . . went west crossing a line of sabkhas [salt flats] in bottom of the valley . . . sabkhas trend N 15° W . . . took some triangulation shots. Some high dunes here are covered with trees . . . the people use the roots to clean their teeth . . . visited the ruins and village of Thaj.*

"We set up a supply camp at al-Hinnah and hired a man to watch it," Hoover went on. "We'd come by every once in a while and we'd play with the guard's little nephew. Well, in October 1965, I was at my desk in Houston and the telephone rang and a man started talking in Arabic. 'Do you remember the supply dump at al-Hinnah?' he asked. 'Do you remember my uncle? You told him to send me to school. He told you he couldn't send me to a school run by [foreigners], but later he did send me to school. I'm working for the company in Dhahran now, in the Accounting Department.' His name is Ahmed Abdullah Quraishi. When Mrs Hoover and I made a visit to Dhahran in 1978, he came and visited us. He was a drilling contractor then, a big, broad-shouldered guy. He was in business drilling water wells."



*"Soak" Hoover (left) and the Ford touring cars he took to Saudi Arabia in 1933.*

Until the spring of 1934, the geologists had little more than chronometers, surveyor's transits, alidades, Brunton compasses and sketchboards to help them chart an unmapped 371,263 square-mile concession (961, 567 square kilometers). Then the famous Fairchild aircraft arrived, and aerial photography greatly simplified the task of mapping. *Thursday, April 12, 1934: Hamayir camp. This was a red-letter day for us . . . the plane from Jubail was due . . . I tried to pick up its signals on the radio, but failed. Sighted the Fairchild at 10:00 A.M. . . . Charles Rocheville brought it in for a slow, pretty landing. Miller, Burchfiel and Dick Kerr got out, congratulated us on such a nice landing field . . . Krug and I took off for a ride after a good lunch . . . followed up the west side of a west-facing escarpment to al-Safa . . . southward, passing to the east of al-Habah . . . then northeast toward camp. The east- and north-east dipping escarpment plays out near al-Safa, but many of the straight ridges east of al-Habah seem to be dipping west- . . . Krug and I enjoyed the ride very much, and they promised to return on the 20th . . .*

As the first season was drawing to a close, Hoover and Krug Henry were recalled from their camp 150 miles west of Jubail (240 kilometers) – their deepest penetration from the coast. As they prepared to leave for Dammam Camp 2 and


The New York Times.

15 KILLED, 18 HURT AS BUS FALLS 35 FEET AND BURNS ON AN OUTING AT OSSINING

DILLINGER SLAIN IN CHICAGO; SHOT DEAD BY FEDERAL MEN IN FRONT OF MOVIE THEATRE

Cummings Says Slaying of Dillinger Is 'Gratifying as Well as Reassuring'

REACHED FOR HIS GUN

finish their detailed examination of the Dammam Dome, Hoover wrote: *Wednesday, May 9, 1934: Jubail. Gathered up odds and ends today. 'Ajab Khan and Hiji have been translating an inscription on a sword Rocheville bought in the suq . . . made for Shah Abbas by a Persian maker of swords. Tonight I called on Muhammed 'Ali, the amir, as invited . . . quite a pleasant chat. The amir wondered if any of our towns were as large as Qatif or Hofuf . . . how much money was in America? Where did all the money go . . . in this depression?*

Hoover describes the work he and Henry did on the structure that ultimately put Casoc – a Socal subsidiary– in the oil business:

"We chained a base line out there in the middle where we could see the various little *jabals* [hills] – Jabal Shamali, Jabal Janubi, Jabal Umm al-Rus. We mapped the rimrock, but for a long time we couldn't bring our indicator beds up to the middle of the structure because they'd been eroded away. Finally we found a rather prolonged hill out there, and it contoured up just like a big bathtub, and it sank down in the middle where the underlying beds had solutioned out. We found the shark-tooth shale and the member that contained *Nummulites* – those were our indicator beds – in that part of the structure. We thought this was quite important. Our guide, Khamis ibn Rimthan, helped us build a little *rijm*, a rock cairn, right up there by Jabal Umm al-Rus. There were three or four little peaks there on the top where the Bedouin used to go and look for what was going on." The date was June 5, 1934 and the spot chosen marked the site of Dammam Well No. 1.

# Kerr: "...that airplane ...was a Magic Carpet"

WRITTEN BY WILLIAM TRACY

*"This was a red-letter day for us," wrote "Soak" Hoover in his diary on April 12, 1934, after Charlie Rocheville landed Casoc's first aircraft at the Hamayir exploration camp, and then took him and his partner "Krug" Henry for their first aerial view of the vast land they were mapping. Though it may seem exaggerated today – when Saudi Arabia's national airline flies jets to the ends of the earth – the arrival of a four-passenger aircraft was an exciting development in 1934.*

*To the men in the field, in fact, that airplane, flown to Jubail by Dick Kerr and Rocheville was a Magic Carpet. It enabled them to see, study, sketch and photograph the secrets of terrain so deceptive that they, traversing and triangulating in their Ford sedans, couldn't decipher anyway near as fast – and sometimes not at all. The plane, it was true, could not eliminate the need to climb down into wadis and caves, to gather fossils, or to chip fragments from the outcrops, but it sure made the job go faster.*

*Furthermore, it made life a whole lot easier for the men out there in the sands. Tom Barger and Jerry Harriss, for example, were once out in the Empty Quarter for four months and, as the late 'Abd al-'Aziz Shalfan said in an interview last year, the plane immediately eased the lot of field parties by bringing in fresh food, mail and news from the tiny Dammam outpost.*

*Because of the size of its concession area, Socal had sought permission from 'Abd al-'Aziz to use a plane and as soon as the geologists landed at Jubail, a man named Dick Kerr was asked to help provide aerial reconnaisance, photography and support to the field parties.*

*Socal could not have picked a better man. As well as being a pilot, Kerr was a geologist, a mechanic and a photographer. He was also energetic and enthusiastic – qualities that came in handy as he helped Socal pick and equip a plane. The plane was a special Fairchild 71, with sand tires, removable panels and windows for geological photography and an extra fuel tank – designed by Rocheville – to permit flights of up to 350 miles (563 kilometers).*

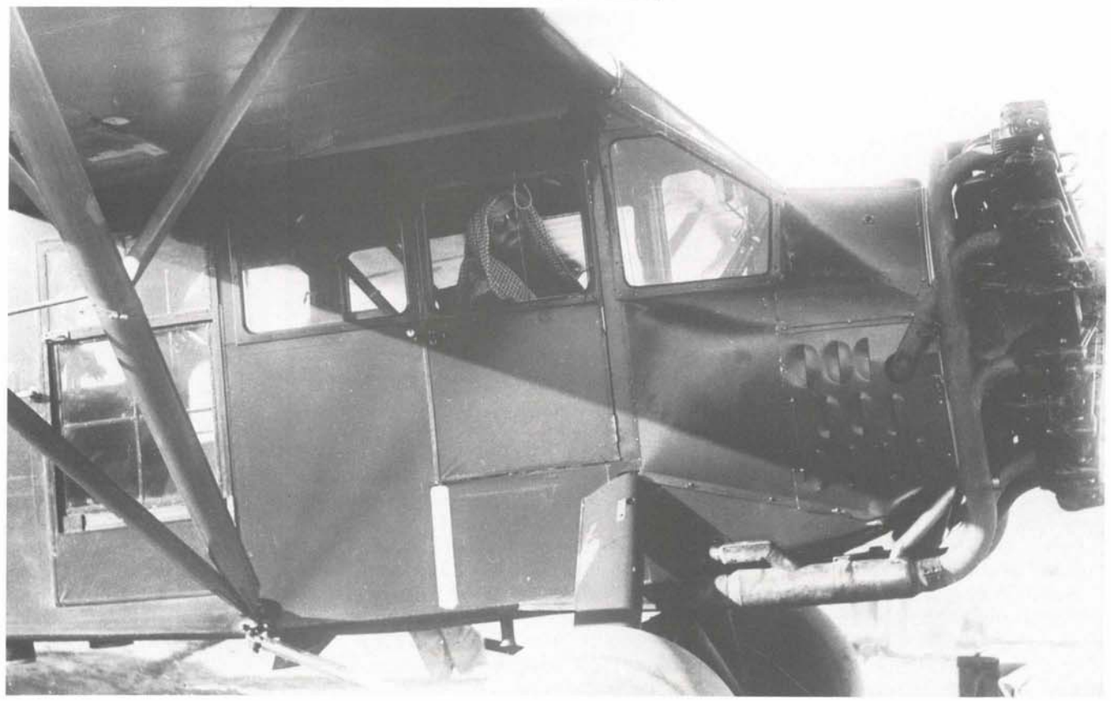
*Kerr also spent two weeks in Rochester, N.Y., where, with Eastman Kodak specialists, he learned how to develop films in hot water as he would have to do in al-Hasa. Then – after a half-hour test flight – Kerr and Rocheville got the Fairchild loaded onto a freighter bound for Egypt on February 6; since they were late, the captain objected strongly, but then gave in. Kerr, as Wallace Stegner wrote in the book* Discovery, *a history of Aramco, was a hard man to refuse. "If he couldn't talk you down, he grinned you down."*

*In Egypt, three weeks later, Kerr and Rocheville spent two weeks getting permission to leave, then got lost in a sandstorm and had to start all over again. Eventually, though, they took off, and using Royal Air Force maps headed for places like Gaza, in Palestine, Rutbah Wells and Baghdad in Iraq, then Basra. In Basra, the RAF warned them to go to Bahrain before going to Jubail, but the Americans decided to go directly to Jubail where, a week earlier, the eight pioneers had leveled an airstrip. Since Rocheville was in the nose of the aircraft, he claimed ever after that he was the ninth man to arrive in al-Hasa, but Kerr, who was the first out of the aircraft, said* he *was and there the matter still stands.*

*After settling some problems with the local authorities, the pilots, about March 30, began the reconnaissance – flying straight, six-mile routes (9.6 kilometers) while two geologists, one on each side, sketched what they saw: encampments, settlements, oases, date palms, hills, wadis, caravan routes – everything. If some feature seemed promising, they took overlapping photographs. Later, when they could use the radio, Kerr and Rocheville worked out a system of triangulation transmissions with the ground geologists that helped tremendously as they began to correct older maps and make new ones.*

*By then, the pilots were also supplying Henry and Hoover, landing on gravel plains, salt flats or even soft sand, thanks to those special soft tires. Kerr and a man named Joe Mountain – Rocheville's successor – also made contributions to the historical archives of the kingdom; both good photographers they compiled an excellent photographic record of life in Arabia 50 years ago. And Kerr, in another contribution, helped saved the life of mechanic Al Carpenter when the* Calarabia *blew up in 1938. Noting that the launch was missing from its berth, he got worried and initiated the search that found Carpenter – and the Saudi crewmen who had held Carpenter on a makeshift raft for 24 hours. He also, according to legend, helped weigh a camel on an A-frame and worked out the ratios by which tires could match a camel's dexterity in sand. No one really believes that, but they tell it because Kerr was that sort of man.*

*The Fairchild (top left), which, piloted by Dick Kerr (above) and Joe Mountain (below), and equipped with aerial cameras (bottom left), made life much easier for the pioneer oilmen.*



Khamis ibn Rimthan – his first name is more correctly "Khumayyis" – the guide who helped place the cairn, is remembered with great respect and affection by all the pioneer oilmen. One of the "pioneers," himself, Khamis eventually got the supreme accolade: they named an oil field after him: the Rimthan field.

Of the tribe of Ajman, Khamis was originally deputed as guide to the geologists by the amir of al-Hasa. Although he could not read, and was unfamiliar with maps, he knew all the landmarks, and had an uncanny skill at finding his way: "When a storm cloud came over, Khamis could tell us there was a puddle of water *hinaak* – over there – two and a half hours away, and we'd go fill up our *ghirbas*, the sheep-hide water bags. He showed us how the Bedouin catch a hawk with a net baited with a kangaroo rat, and then how they train it. And while other guides would try to tell us what they thought we wanted to hear, Khamis would tell us what we needed to know."

Or nearly always. Hoover once asked Khamis to describe a particular *jabal* just north of the Iraqi border, but this time, for reasons of his own, the guide demurred.

"Khamis, I know you were up there," said Hoover. "But Hoover," he said, covering a smile with his hand, "that was before I became a geologist."

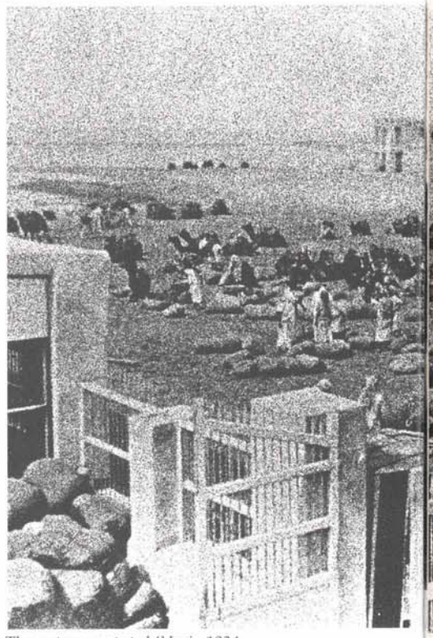
Says Hoover: "Khamis was one of the top hands of all the people I've ever known anywhere. I was lucky to have him with me all three seasons. We became good friends, close friends."

By the middle of June, 1934, there were 10 Americans – seven of them geologists – working in al-Hasa. The geologists had earned a respite from the brutal summer heat, and decided to go to the cool mountains of Lebanon. First, however, they had to develop and print the film taken by Dick Kerr with his aerial camera and locate and name important features – with the help of Khamis and Allen White. At the last minute, Hoover was given the task of guiding two engineers who came to survey harbor and terminal facilities at Ras Tanura: *Saturday, June 30, 1934: Ras Tanura. At anchor. By launch to Dammam . . . and then we made it to Ras Tanura in 1¾ hours . . . walked across peninsula to find deep water 600 feet from shore* [183 meters] *. . . Now the pearling boats are sailing in for the night. Two pearl buyers from Bahrain just came aboard for quinine . . . boats from all over the Gulf, Kuwait to Qatar, are coming in . . .*

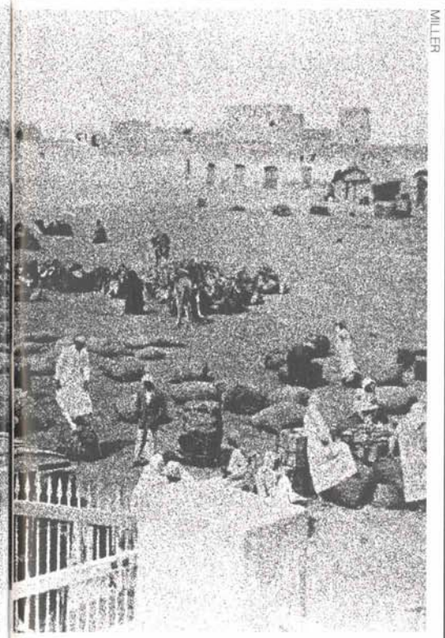
Finally, though, Hoover and his fellow geologists set off for Lebanon, where on August 13, 1934, they attended the wedding of Krug Henry and Annette Rabil – whom Henry met, courted and won within weeks of leaving al-Hasa. Hoover then set off on a tour of Palestine, Cairo and Damascus. On their return to Jubail, the geologists were joined by Max Steineke – who would be the first man to provide a comprehensive view of the stratigraphy and underlying structure of the almost featureless face of what came to be called the Eastern Province. They were soon joined by Floyd Ohliger, the first petroleum engineer to arrive in Saudi Arabia, the man who would "push tools" for the Dammam well, and become "the first boss of the company." But it was the name of Hugh Burchfiel that would figure most prominently in Hoover's diary during the second exploration season.

"I'd known Hugh in West Texas," Hoover says. "He was my partner for the second season. We worked west of that long, narrow sandy body called the Dahna, and we felt that we'd gotten up to some of the older beds." This narrow strip of reddish sand runs down the peninsula from north to south, connecting the Great Nafud desert with the Rub' al-Khali. Although its importance as a barrier to east-west travel has been exaggerated, it is an impressive sight. Hoover and Burchfiel examined the area in April, 1935: *Sunday, April 7, 1935. Camped at al-Qaiya wells . . . found the Dahna to be approximately 44 kilometers wide* [27 miles] *in a southwesterly direction, our route being about S 47° W most of the time. Immediately on the west side of the Dahna we found limestone outcrops that were fossiliferous, likely Cretaceous. This limestone rises about 1° to the west and for about 18 kilometers* [11 miles] *makes a very stony rolling plain covered by a thin skiff of sand . . . about 3 kilometers* [1.8 miles] *east of al-Qaiya on the trail, the plain levels a bit and the limestone cobbles become pebbles . . . Monday, April 8, 1935. Camp al-Khufaisah . . . about 21 kilometers* [13 miles] *from al-Qaiya we found ourselves on the edge of a limestone escarpment overlooking Wadi Butayn . . . have had any number of visitors. One party came to the amir's tent and said, 'Who are these people?' 'Ibn Jiluwi's men,' was the reply. 'What do they want?' 'They are going to Qasim,' answers the amir. 'Is it necessary for them to go to Qasim?' 'Yes,' replied our amir, and there the conversation ended.*

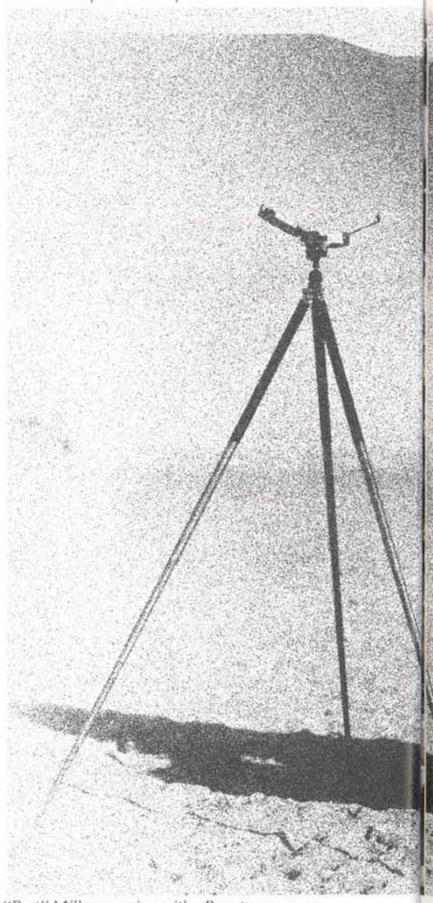
On April 10, Hoover visited the two famous old towns of Buraydah and 'Unayzah. It was in 'Unayzah that he met Doughty's host, 'Abd al'Aziz 'Abd Allah al-Sulayim: *Wednesday, April 10, 1935. 'Unayzah. We were received by a loveable old man, 'Abd al-'Aziz 'Abd Allah al-Sulayim, who resigned his amirship to his nephew some 11 or 12 years ago . . . By mistake our amir of soldiers had addressed his letter of our coming to the venerable old uncle, who was proud to have received it. 'I'm asking you to stay,' he said. 'The amir*



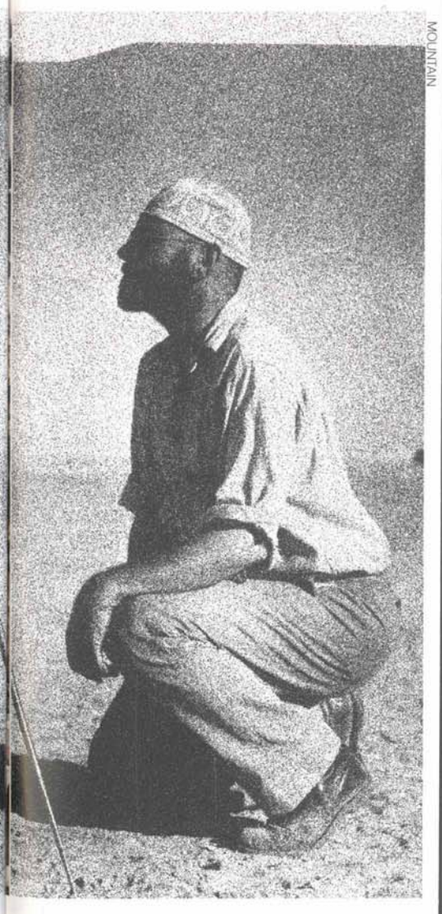
*The customs post at al-'Uqair, 1934.*



MILLER



*"Bert" Miller mapping with a Brunton compass.*



MOUNTAIN

# Miller: "I was the fourth, fifth or sixth westerner ever to cross Arabia"

WRITTEN BY LYN MABY

*"When we drove around the structure, we could see right away it was a textbook illustration of a dome," said Robert P. "Bert" Miller in recalling the day, 50 years ago, when he and S. B. "Krug" Henry – the first two geologists to land in Saudi Arabia – were on site for the first time at the limestone hills called Jabal Dhahran. During the first week after their arrival, Miller and Henry carried out a reconnaisance of almost 75 miles of the coast of al-Hasa (120 kilometers) beyond Qatif oasis on the limestone outcroppings they had sighted from Bahrain. They would name the site the "Dammam Dome," and their instincts told them – correctly – that it was what would put them in the oil business.*

*"We drove along the west end of the structure, and we could see the beds dipping away from a common center," Miller said. "We got on one of the beds and drove around it, and we knew then, in just a few minutes; it was like a copy of Bahrain Island. To get two structures like that was rather a marvelous thing."*

*At the same time – 10,000 miles away in San Francisco (16,000 kilometers) – Standard Oil of California and its executives were betting on the presence of oil in Saudi Arabia, a calculated risk taken in days of severe economic depression. The task of the expedition Miller headed was to see if the company was right or wrong.*

*Miller came to the Arabian venture with, in his own words, "a lot of experience living in tents." He had been up the Great Slave and Mackenzie rivers to the Arctic Circle, worked in Sicily and Spain, in Colombia and Venezuela, in Ethiopia and Somaliland, and just about all the world between the Aleutians and Assam Province of India – where elephants hauled his gear.*

*He also came with a lot of experience with his fellow geologist Krug Henry. Miller and Henry had been friends since their student days at the University of California – and to Bahrain in 1932. Both, in Saudi Arabia, also grew beards – "so we'd be less conspicuous," – and both, sensibly, adopted Arab headdress. They also managed to memorize a few phrases of Arabic.*

*On Bahrain, Miller said, he and Henry also made careful preparations for Saudi Arabia. "A very fine missionary doctor on Bahrain – his name was Dr. Dame – helped us get medicines and medical equipment together, and we fitted it all into three large teakwood chests I ordered from the local cabinet makers." In the desert, as a result, the Bedouin grapevine seems to have spread the word that each American was a doctor.*

*"The company's policy was always to make it as comfortable as possible for the men, and I was particularly concerned about basic rules of sanitation, like clean hands and boiled water. But I quickly found that if I observed all the rules of sanitation, I wouldn't get any work done. So I established a happy medium, you might say." Apparently, Miller arrived at the right combination. He lived to be 91 and was living happily with his wife in a casual country house overlooking the Russian River in northern California, when he was interviewed in 1983 for this anniversary issue of* Aramco World *– and when, early this year, he died.*

*"I was the fourth, fifth, or sixth westerner ever to cross Arabia. There were three of us in the car, you see, so one couldn't say which was which – just that three other westerners had done it ahead of us." Miller was accompanied on that journey by Lloyd Hamilton, the Socal negotiator of the oil concession agreement, and Felix Dreyfus, a mechanic and a member of the first season's team of 10 men. Their epic journey was made more memorable by an audience with His Majesty King 'Abd al-'Aziz. Near Jiddah, they were also greeted by the British explorer Harry St. John Philby.*

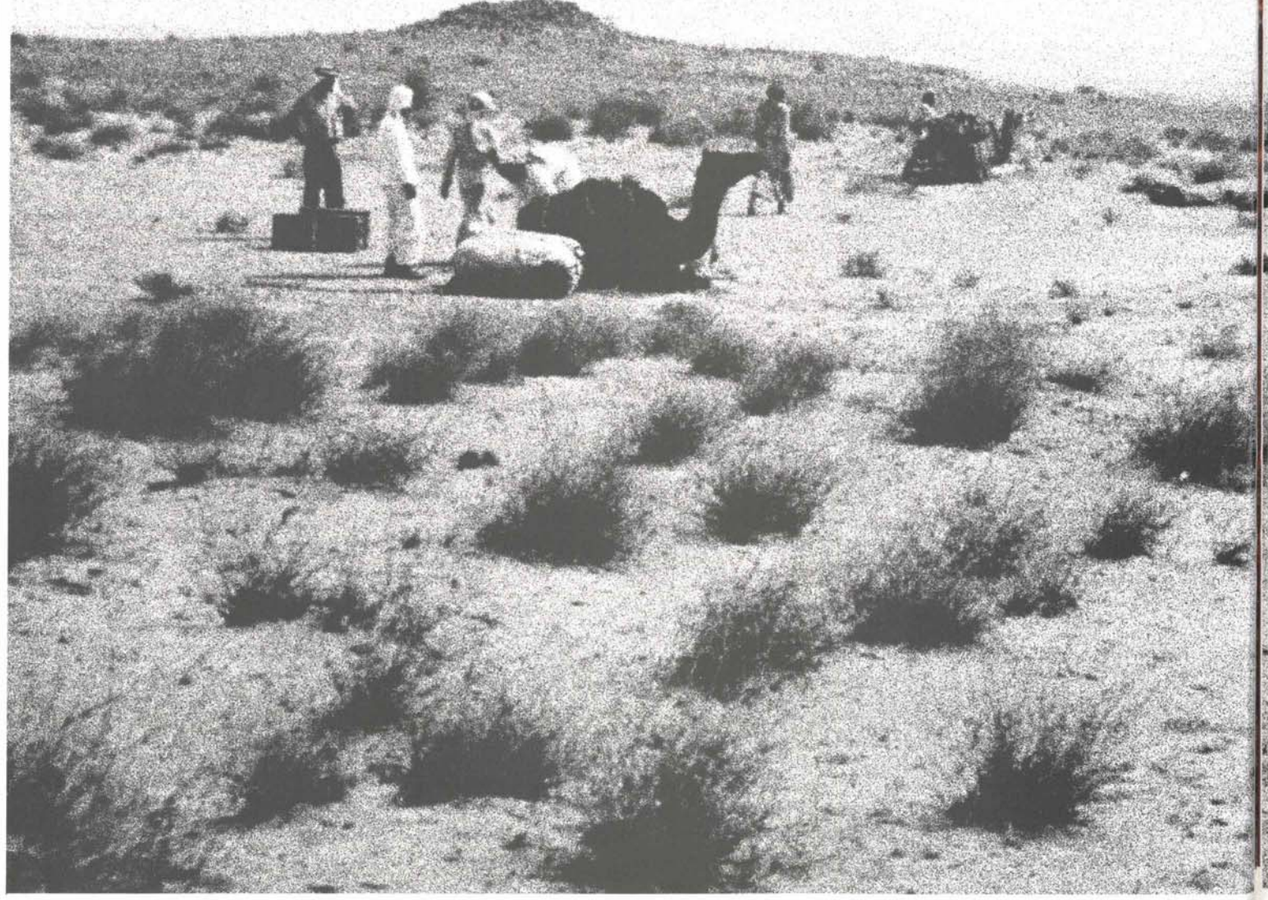
*In 1956, Miller, who went on to work in Italy, India and Columbia and to become a Socal executive before his retirement, went back out to Saudi Arabia to visit the company that had become Aramco – and what he saw was another textbook example – of how times change, and how time changes men. In the field camps in 1956, he said, some geologists considered it a hardship to eat vanilla ice-cream three days in a row.*

*has nothing to do with it. I want you to stay a month . . . anything in 'Unayzah is yours.'*

"In remote country like that," recalls Hoover, "the only news they got was from people who came to visit. We were asked a lot of things . . . Where did we come from . . . What did we see . . . How many Muslims were there in the United States? Actually, they were all as charming as could be. Before we left, the old uncle showed us through one of his gardens, stopping at each plant or tree and demanding that we give its name in Arabic. The last plant was a strange one, and we gave up. He said, 'I don't know either,' and laughed."

Geologists are by education trained observers, and Hoover's diary is a conglomerate of physical geology, Bedouin custom and the impressions of a field naturalist: *Friday, January 25, 1935. Camp Foag. We mapped southwest today, toward Wabra . . . brought in meat for the hawks. It takes one* hubara *per day for our four falcons and procuring same is sometimes a chore . . . Ibn Jiluwi has 250 camels grazing near here now . . . a high percentage of white camels in the herd . . . Tuesday, February 19, 1935. Camp al-Rahayah. We have gone botanical . . . most of the area in full bloom . . . have gathered bulbs of the* 'urnun, *a large asparagus-like plant which puts out blossoms around a torch-shaped head . . . another bulb, the* rubahla, *its blossom quite intricate and lavender in color . . . any number of strange little wild flowers abound . . . Sunday, March 10, 1935. Camp al-Rahayah . . . sketched on our aerial photographs, putting in a long day . . . drove past three Bedouin tents, stopped for coffee, dates and new sheep's butter . . . their most magnificent gesture is to place their food before you. Also came upon 43 "houses of hair" all in one encampment . . . Hugh and I chose two nice fat sheep . . . we're giving them to the soldiers for the 'Id (religious holiday) tomorrow.*

*Above: Dhahran camp in 1937. Below: Equipment arriving for the first geological survey.*



In September 1935, Hoover and Max Steineke explored the area around Dammam Camp, now the site of Dhahran. Hoover found that what they said of Steineke – that he almost never stopped driving, never stopped thinking, and could never be bothered with extraneous details – was almost literally true. "Max was an interesting character – seems like so many of those early guys were characters. I worked with him my last year. We started out working on fossils: *Wednesday, September 25, 1935: Dammam Camp. Max Steineke and I went out to the deep syncline between* jabals *Umm ar-Rus and Midra Shamali . . . spent the whole afternoon gathering fossils . . . found large pelecypods, medium-sized gastropods, huge conus . . . in similar lithology to the beds composing the al-Alat structure . . . Friday, September 27, 1935: Dammam Camp. Today Max and I visited* jabals *Midra Shamali and Janubi . . . found the Miocene "Button" (Echinoid) bed and established their elevations . . .*

Later in that season, Hoover and Steineke went north to Khurma Karim, near the border with Iraq. Hoover asked Allen White, who had known Max Steineke in South America, what to pack.

"Soak," he said, "you take one of everything for you, and you take one for Max, and you take one for Max to lose, and you'll come out about right."

By the time Hoover finished his third and final season in Saudi Arabia, the first footsteps in the Arabian oil story had become a foothold. In his last geological report he deduced that the domes of Khurma Karim were only surface features. The first report written by Hoover and Henry recommended the drilling of Dammam Dome. Other geologists encouraged further exploration in central al-Hasa. The al-Alat structure near Abqaiq had already been plane tabled and scheduled for future drilling.

Dammam Well No. 1 had been encouraging, but it was not a commercial producer and ended up as a stand-by gas well. Several more wildcats remained to be drilled – all aimed at the Bahrain zone which here had "shaled out" – before the first deep-test hole turned the frontier into a boom-town.

Soak Hoover went to Saudi Arabia 50 years ago with a job to do. For three years he did that job, then left – richer by a wealth of experience that, as his diaries suggest and as he confirms in person, also stretched his capacity for wonder.

# Strangers from a World Unknown

WRITTEN BY PHIL McCONNELL

"I tell this story as part of a larger history. It is the story of a small group of men – some American, some Saudi Arab – meeting, working together, learning each others' ways, overcoming unforeseen difficulties, persevering and, by their actions, contributing to what came after.

A few months after the signing of the concession agreement between the Saudi government and Socal, the geologists came exploring. The first two, 'Bert' Miller and 'Krug' Henry, landed at the small coastal community of Jubail, where Arab dhows lay tilted on the sands at low tide awaiting the return of the water, and a few palm trees offered meager shade. Their arrival created as much excitement as a circus in a small Indiana town. They were strangers from a world unknown to the Bedouins – strangers who found the Bedouin's camels and deserts equally strange.

They entered a land of rocky, graveled soil, a flat land relieved by an occasional rocky *jabal*, and in September, when they arrived, the heat waves tossed mirages over the *sabkhas* [salt flats]. Sometimes they saw a gowned Bedouin guiding his small flock of sheep or goats into the slight depressions, where they searched among the rocks for the few wisps of dried grass left from the previous winter rains.

In exploring this land, the Americans, at first, traveled in what, then, we called 'sedans.' They were passenger cars, and since they were equipped with small tires that sank into the sand, discouraging digging operations were frequent; back then the only roads were the long trails beaten into the sand by camel caravans. Then, in March of 1934, the exploration effort was greatly assisted by the arrival of Dick Kerr in a Fairchild plane especially designed for aerial photography. By June, the organization, had grown to 10 Americans, now employees of a new Socal subsidiary called 'Casoc'. Chiefly geologists, these 10 were already prepared to recommend a location for the first wildcat, or exploratory well. They placed it a few miles from the shore of the Gulf on the flank of a *jabal* named Dhahran. It was the same *jabal* that the Americans on the island of Bahrain had observed in earlier years, causing them to speculate on the possibilities of finding oil in a land still unexplored by geologists.

In 1935 the wildcatters – or drilling crews – came, traveling by launch from Bahrain. They came ashore at a small fishing village called al-Khobar, a few miles from Jabal Dhahran. The land they entered offered them the sand and the rock on which they stood, and the air that they breathed; beyond that they had to bring everything they needed for living and working, even, at first, their drinking water. Like the geologists before them, they were pioneers in the fullest sense of the word.

*The first group of American oil men at Jubail in October, 1934.*

MOUNTAIN

By the following April they had developed sources of drinking water, built the simple structures they required and assembled their equipment. In those days, and for a long time after, they drilled with 'cable' tools that dig much slower than rotary equipment, but require much less material and support for operation. They drilled throughout a summer of wind and heat and into the fall before they encountered oil; it caused jubilation in both Saudi Arabia and San Francisco, but continued drilling and testing showed too little oil or gas to have commercial value, and the rejoicing died.

The second well renewed their hope. On a short test, oil flowed from it at a rate equal to nearly 4,000 barrels per day. In San Francisco, joy again flowed with equal abundance and within a week the drillers were authorized to drill four more wells in Dammam, plus a wildcat in an area that appeared promising some 20 miles distant (32 kilometers). Fred Davies, the manager in the field, was dubious concerning the rush to start four more wells in Dammam, and suggested that operations might be pushed too rapidly. But the San Francisco office brushed aside his suggestions. Oil had been discovered! Let's go!

But a few weeks later, when Well No. 2 (closed because of lack of oil storage tanks) was reopened, it produced chiefly water – and that would be the pattern for the next two years: holes drilled into the zone (a layer of earth or rock) where showings of oil had been encountered, alternately stirring up their hopes and plunging them into disappointment. None of the holes yielded enough oil to justify operation.

At first, the management of Socal was unwilling to admit that the Saudi Arabian project might be a failure. The oil must be there – somewhere – so the company continued to send in more men and more materials. It expanded the camp at Dhahran (all oil field communities are known as camps) with permanent buildings, added air cooling (that sometimes even worked), built roads and sank water wells. Indicating their intention to create a permanent community, Socal even built family housing, and in 1937, six wives arrived to occupy those houses. By July of that year, the number of American employees had risen to 53.

But soon management began to wonder. Where *was* the oil of Saudi Arabia? Was this another multi-million-dollar effort that would have to be written off? It did seem so. As the months and years passed, the hopes for finding oil slowly drained away, and

geologists sent to Saudi Arabia now were told that they could expect to move on to other foreign operations soon.

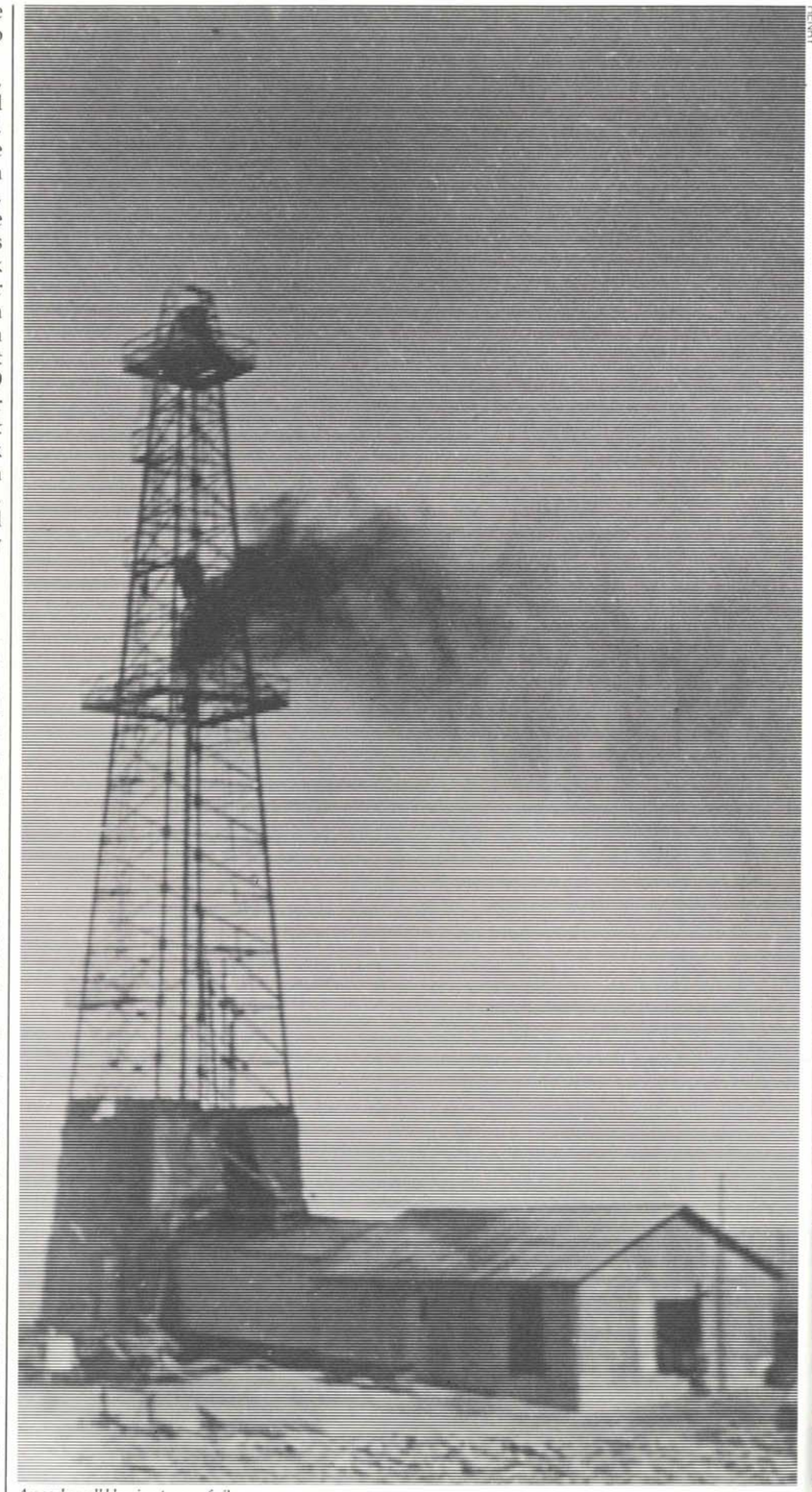
Coincident with the camp expansion, however, the Socal wildcatters had started to drill their seventh well: Dammam No. 7. It was started in December, 1936, this time to seek for oil in formations deeper than those tested by earlier holes. From the start, this effort encountered far more than the amount of trouble to which drilling wells normally are subjected. Caving rock, stuck drill pipe and equipment failures one after another, turned Dammam No. 7 into a nightmare. The struggle continued for a year and a quarter. But at the end of that period, in a zone some 2,000 feet (609 meters) below that penetrated by earlier holes, they encountered oil, and on a test (even on the test, the drill pipe got stuck and was never recovered) it produced at a rate of nearly 4,000 barrels of oil daily, and, unlike Dammam No. 2, that had raised their hopes briefly back in 1936, the flow from No. 7 continued.

"This was the first well to penetrate what thereafter was designated as the 'Arab Zone,' a geological layer of earth or rock, which proved to be the major source of oil in Saudi Arabia. It provided the first reliable evidence that the huge expenditures of the exploration period might be recovered – and that a dependable source of income for the Saudi Arabian government was likely.

As a result Casoc began to funnel men, machinery and money into Arabia and to set up an organization strong enough to handle the development of these new, promising sources of oil. The result was the sudden integration of two totally different cultures – one American, the other Arabian.

The Casoc organization that arrived in Saudi Arabia in the early 1930s entered a country in which industrialization, according to western concepts, was hardly recognized and certainly not understood. In turn, these Americans had practically no knowledge nor understanding of the society that they were about to encounter. But though the collision of two radically different social patterns presented an excellent opportunity for conflict, wisdom and restraint prevailed as both groups faced up to the task of learning how to live together in harmony. The Americans, brash by nature and background, came to respect Saudi customs, and the Saudis learned that industry, to be effective, depends on organization and scheduling.

One possible source of conflict that emerged almost as soon as Casoc began to recruit, employ and train Arabs for work in



*An early well blowing traces of oil.*

the oil industry, was a radically different attitude toward work, money and other western concepts. Effective training of this new work force was an essential part of the operation from the start; indeed, under the terms of the original agreement, one of the fundamental Casoc objectives was the employment and training of Saudis. But the reaction of the Saudi people to this modification of their lives was not always enthusiastic; sometimes, in fact, the reaction was dark suspicion – as one story from Saleh Sowayigh, one of the company's top Saudi employees at the time, suggests.

In Hofuf, one day, where Saleh had been sent to recruit unskilled laborers, he overheard two Bedouins in animated discussion outside his open window. One was telling his companion that he had decided to sign up with the company, and the other was wondering why:

'But why do you want to work for the company?' he asked. 'Do you know anything about the company?'

'Well, no. But I think I'd like to work for the company and get some money.'

'Get some money!' the other exclaimed. 'Why do you want money? Look at you. You [are married] and you have four sons. You've got 50 camels and 80 sheep. You are very well off. What do you need money for?'

'Well,' remarked the prospective employee, 'I have to provide for my sons; and they are going to get married – and I'd like to have some money.'

With marked contempt, his companion replied, 'You won't like it with the company.'

'Why not?'

'Well – here you are, a free man. You were born in the desert. No one tells you what to do. Now look at what they will tell you to do in the company. They blow whistles at you to tell you to go to work, whistles at you to stop work, whistles at you to go to work, whistles at you to stop work. Brother,' the friend advised, 'you won't like it.'

There were other, deeper differences, too. Some years later, as an example, Bill Palmer was entertaining Abdullah Sulaiman, the minister of finance and second most powerful man in the government. At sundown, the minister moved to a spot near the outer door, faced Makkah (Mecca) and performed his evening prayers, kneeling and prostrating himself according to Muslim custom. The minister showed no hesitancy and afterwards returned without comment to conversation with his hosts.

Tom Barger, later to become company chairman, also had stories to tell about the Arab education of Americans on the subject of Arab culture. One involved a Bedouin who asked Tom to lend him 1,000 riyals, the equivalent of $300 to $400. Tom commented that this was a lot of money for a man who earned about two riyals daily. The Bedouin explained that he owed this large debt, and if he did not pay, he was in danger of being jailed as a debtor.

"Then how, Tom asked curiously, did he expect to pay back the loan? The Bedouin replied that he had sent a relative to locate their segment of their tribe, and that when the relative found them the money would be brought back to Dhahran and paid to Tom.

How would the relative find their tribal members?

Oh, that was no problem. They were out there somewhere between Dhahran and the Dahna sands [a distance of about 100 miles (160 kilometers)].

But what assurance did the Bedouin have that the desert group would send the money back with the relative?

Of *course* they would send the money, the Bedouin replied. This was his *family*...

With the coming of the Americans in force, al-Hasa, at least near Dhahran, began to change visibly. More buildings were constructed – residences for families, improved bunkhouses for single men, shops and storehouses – and on a huge sandspit

*An early exploration camp in Arabia.*

named Ras Tanura, some 25 air miles (40 kilometers) to the north and about 40 miles (64 kilometers) by road, construction of a huge oil port got underway. Close to deep water, a condition rarely found in the predominantly shallow waters along the Gulf's western shore, Ras Tanura was to become an enormous oil shipping facility with 3,000 feet of trellis (914 meters) extending out to deep water and a 10-inch (25-centimeter) pipeline carrying oil from the Dammam field to Ras Tanura. A smaller shipping point was established at al-Kho-


NEW YORK
Herald Tribune

33 Reported Killed As Hindenburg Explodes And Crashes to Earth in Flames at Lakehurst

Craft Is Rocked by Sudden Blast, Dives On to Airfield, Mass of Flaming Wreckage

bar, where shallow draft barges could receive oil to carry to the Bahrain refinery about 16 miles to the southeast (27 kilometers).

Simultaneously, Casoc began to tackle special projects for, or in conjunction with, the government – a procedure that would become standard as time went on. A hydrographic survey of coastal waters, for example, was expanded to extend from Kuwait on the north to the Qatar Peninsula on the southeast; a survey team developed data that helped settle the location of the northern boundary with Iraq; and a geological group made astronomical observations in the Salwa area near the Qatar boundary.

There was more to the Saudi Arabia experience than just work, of course, though to most newcomers from the States, this was not immediately obvious. To them, the desert of Saudi Arabia was a place of uncertainty, a place that presented, even threatened, entirely new experiences. The vastness of the open unending land produced a touch of awe, even fear. How, the stranger might ask himself, could he find stimulus in its implacable dullness? Would it become a boundless prison, an unending monotony?

To some the answer was 'yes'. But to others the desert was a challenge and a delight. In time, if the neophyte were to become a part of the working body, he or she would begin to see something in the great sweeps of rocky soil, in the majestic flow of the dunes, in the marvel of the night when the stars floated just beyond reach, and the moon turned the Gulf into a plate of bur-

nished silver. In that awareness, the stranger began to abandon the fear of barrenness and to think more of the opportunity to move with so few limitations, to become a part of the space.

"Max Steineke was that sort. The muchloved chief geologist, who had investigated most of the surface of eastern Saudi Arabia, was an addict of dune travel. He enjoyed driving his car down the south slopes just for the hell of it, knowing that a successful journey depended on reaching the dune crest at just the right speed. If the car arrived at that critical spot too slowly, it would be stuck when the front wheels moved beyond the crest into space and the car body dropped into the loose sand. But if the vehicle came to the crest too rapidly, it would shoot out too far before it began to drop, hit the slope too hard and fast, and run into the hard ground at the base of the dune.

The pleasure of dune travel was greatest in the winter, after the rains had firmed the sand. On a journey beyond the area of normal field operations, caravans of two or three cars might travel together. With firm sand beneath the tires and the smooth curves of the dunes ahead, the journey could assume some of the excitement of a glorified fox hunt.

Like a hunter behind hounds spurring his horse over the countryside, the driver of each car met the challenge of the dunes alone, but in close cooperation with his companions. Quickly, he selected his route as the view opened before him, maintaining general contact with the other cars traveling more or less abreast of him. A three-car caravan could move comfortably at a 30-mile-an-hour (48-kilometer) rate as each member swept down slopes, swerving quickly to avoid a sharp drop or a patch of scrub, engine roaring as the driver charged the next slope with only the sky and the crest in view.

In the open undulating country lacking roads and permanent human habitations, the rules of care for one another were well recognized. A car was not permitted to disappear for long. Where vehicles traveled in line, the one ahead was responsible for the one behind it. If that vehicle failed to appear after a reasonable interval, the one in front retraced its tracks until the missing car was found.

As Casoc settled down in al-Hasa, its active development program of drilling and geological exploration was initiated. An oil reservoir had been located, but new channels were needed – channels reaching down nearly a mile below the earth's surface to bring the oil flowing to the surface into tanks and then to the refinery on Bahrain.

Expansion of geological knowledge also continued at a brisk pace. In addition to surface studies, seismograph crews began to examine the position of the earth's deep-seated rock layers , and in areas where the possibilities for oil accumulation appeared promising, structure drilling crews punched holes several hundred feet deep, not to find oil, but to determine the structure of shallow layers – structures that could be expected to continue to lower beds where oil might be found.

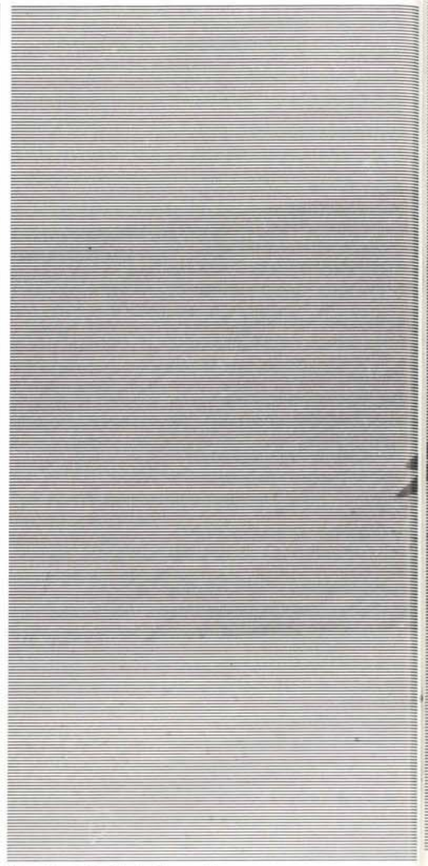
Almost at once, their exploration brought promises of rewards. Southwest of Dhahran, beyond Hofuf, evidence of a great uplift in the subterranean rocks began to appear and at Abu Hadriya, over 100 miles (160 kilometers) to the northwest, they began to drill a test well – a procedure that by then was almost a routine.

In Abu Hadriya's open desert, far removed from human habitation, the drilling crews assembled their engines and pumps and reared a thin derrick in defiance of the limitless space that engulfed them. As in all Casoc wildcat operations, they established a small camp, including palm-thatched dwellings – called *barastis* – a bunkhouse, a kitchen, and a dining room. In one end of that building, they placed some battered easy chairs and a few well-worn magazines and books. When off duty, they hunted for gazelles or game birds to add to the diet.

When they arrived at Abu Hadriya in October, 1938, the weather was excellent, but during the following 17 months, they would experience all variations of climate: winter cold, spring winds and summer's scorching heat. But with air cooling – when the generators and compressors worked – they survived comfortably and in December started to drill. For the following year and a quarter, they would dig and test, know discouragement and hope, would test and find nothing, then deepen and test again.

One of the highlights of that period was the April 1939 visit of King Ibn Sa'ud – as we then habitually called him – to the Eastern Province. He came, with his scores of retainers and his presence brought a gathering of the Bedouin shaikhs of the area, each with *his* retainers, to pay their respects, and on the plain below the Jabal Dhahran, the tents (chiefly white for this occasion) sprouted like mushrooms. The business of developing oil had to be shelved for the better part of two weeks while the facilities of the community were devoted to providing for the needs of the Saudi assemblage.

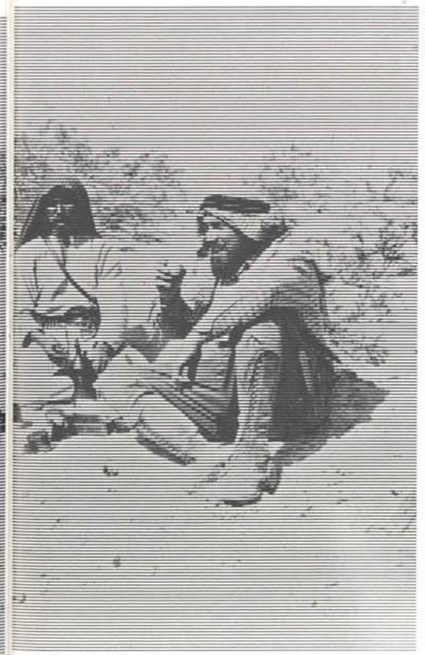
During the celebration, the king was taken to the newly developed port of Ras Tanura where he opened a valve on an oil



*Dune travel by Dodge Power Wagon.*

*Geologists Max Steineke (right) and Tom Koch (left) take coffee*

KERR



MILLER

*with their Saudi escort.*

# Steineke: "He left the most beautiful touches in the heart."

WRITTEN BY WILLIAM TRACY

*"Everybody worked their hearts out for him," said Tom Barger, the miner-turned-geologist who became Aramco's chairman. "He discovered more oil than anyone else in the industry," wrote colleague Phil McConnell. "He left the most beautiful touches in the heart," said 'Abd al-'Aziz Shalfan, the Najdi youth who became Aramco's oldest employee.*

*The man they were describing, of course, is the legendary Max Steineke, the beloved and highly respected chief geologist who unraveled the geological secrets of Saudi Arabia – and seems to have won the hearts and minds of everyone he met in doing so.*

*Steineke, clearly, was an unusual man. "Burly, big-jawed, hearty, enthusiastic, profane, indefatigable, careless of irrelevant detail and implacable in tracking down a line of inquiry, he made men like him, and won their confidence," as author Wallace Stegner summed him up.*

*Steineke was a bit late in getting to Arabia; he didn't arrive until the 1934-35 field season was well underway. But he came with the right credentials for al-Hasa 50 years ago: a degree from Stanford, 13 years as a Socal geologist, experience in areas such as Alaska, Colombia, and New Zealand, a taste for the outdoors and an unlimited capacity for work.*

*"Max," Barger recalls, "had great curiosity, great imagination. And he had no stumbling blocks. He would take his brainchildren and strangle them, throw them away, if some evidence was adduced that wasn't explainable by his hypothesis. He felt that defending a hypothesis was a waste of time – that you looked at the evidence and made the best guesses you could at what it meant and how the phenomena you were observing came about. Then, if new facts came to light that made this hypothesis worthless, you threw it away. One time Max was with some V.I.P.'s looking over big maps and he was explaining what had been done the previous year and said: 'Down here is an anticlinal structure.' One of them said, 'I thought you said, Max, that this was a synclinal area.' 'Oh yes,' he said, 'we did, we did, but we know a lot more about it now. Now as I was saying, this is an anticlinal area down here . . .'*

*"He always talked to every young geologist that came in. This is a ploy used by some managers to make people feel at home, like part of the team. But Max talked to them because he thought* he *might learn something he didn't know! Incredible!*

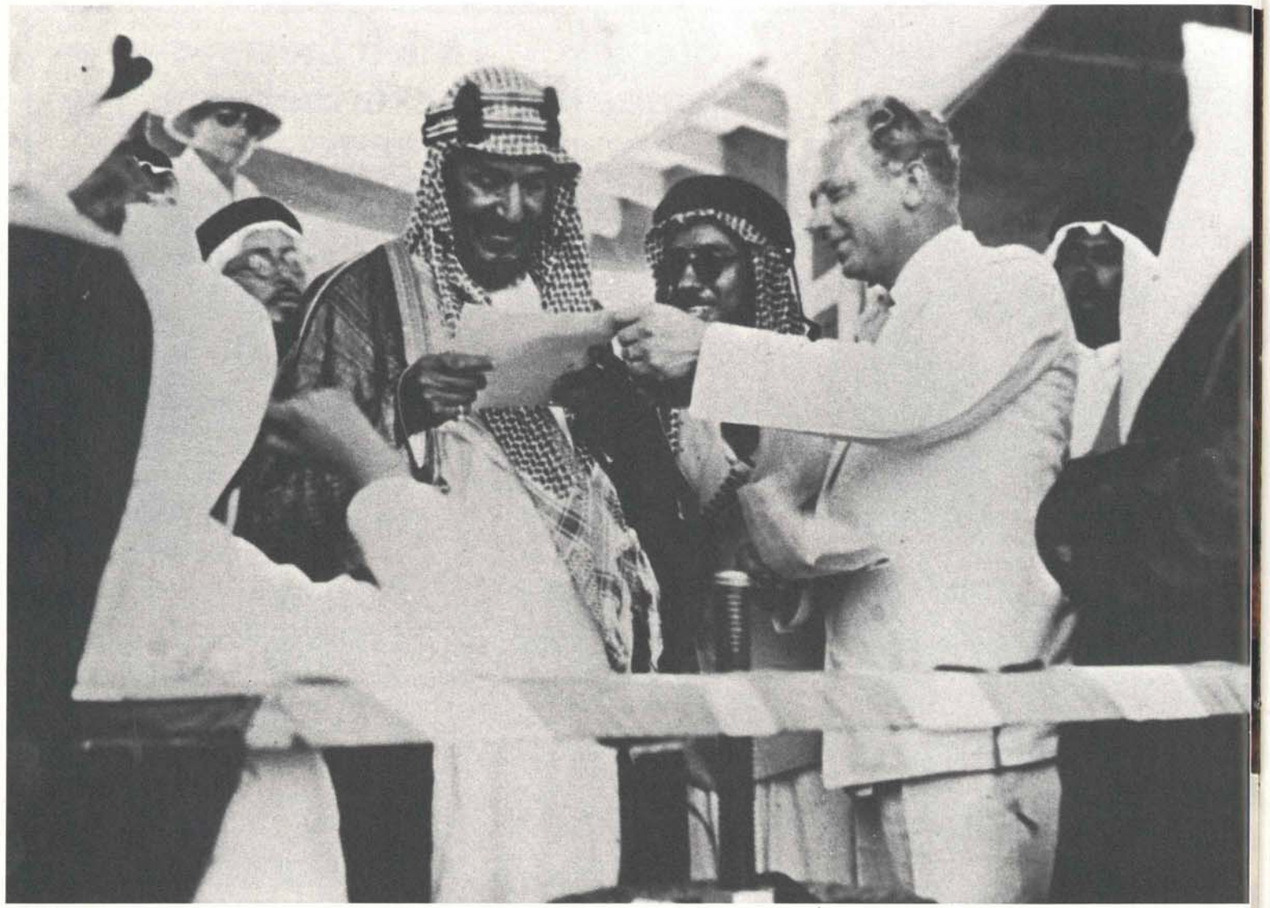
*"He couldn't stand lack of curiosity. The only guy I know he fired was the chief of a party of geologists. Max went out to visit their camp – he always came out to see you on the job periodically – and as they left the camp and were driving along, Max looked around and saw a little range of hills a mile or two off the road. 'What's that?' said Max. 'What's that white stuff on top of those* jabals *over there, Dutch?' And Dutch said, 'You know, I don't know. I've often wondered myself.' And with that, Max said, 'Dutch, let's turn around and go back.' He couldn't understand why a man who was driving past every day and was curious didn't go over and see what it was.*

*"One of the problems in field work is to keep your equipment running; the longer you kept it running, the longer you could work and the more you could get done. But if a guy wasn't mechanically inclined and had to holler for help more than another, Max didn't hold that against him, because, after all, he had been hired because he was a geologist and not because he was a mechanic.*

*"He was a humble man. He would never hurt people's feelings intentionally. But once we were all sitting at table in the dining hall. The food was served family style; we'd pass the food around the table and help ourselves. There was a man from Bapco who was overweight, and he was sitting across the table from Max. Max was eating his dinner and not paying any attention to the conversation. This guy said to Max, 'Max, it seems to me you lost a lot of weight. How'd you do that, Max?'*

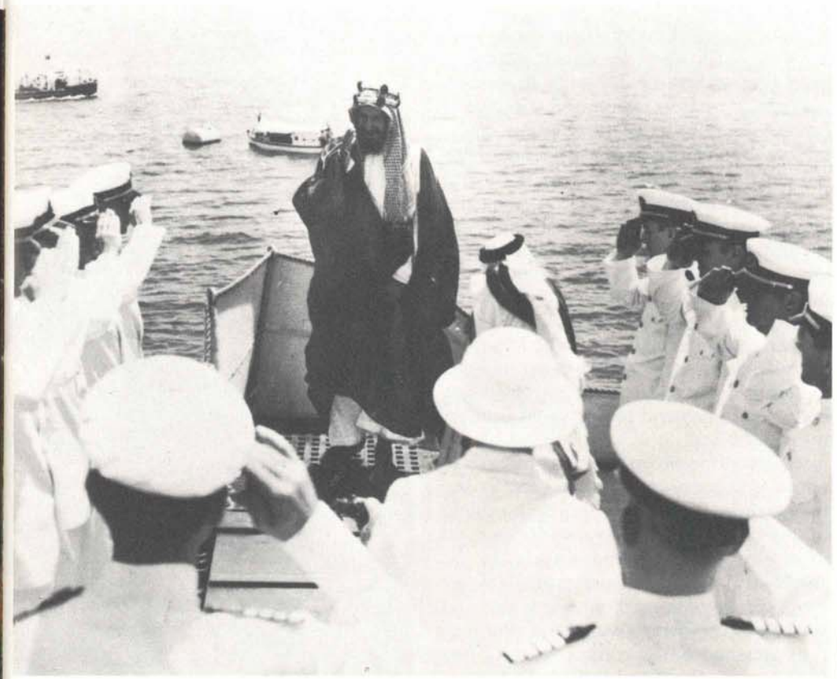
*"Now this guy had a plate that was just filled to the brim, which Max hadn't noticed at all. 'Oh,' he said, 'just by not being a damn hog, that's all.' And the rest of us just couldn't contain ourselves. He would never have said that if he'd looked up."*

*In recognition of what one writer called "his uncanny faculty for reconnaissance . . ." Steineke was awarded a medal by the American Association of Petroleum Geologists in 1951 a year before he died. And in Dhahran his name is preserved at Steineke Hall, Aramco's guest house.*



*To celebrate the first shipment of Saudi oil in 1938, King 'Abd al-'Aziz visited Dhahran and Ras Tanura, where, l-r top, he: read congratulatory cables, boarded the tanker* D.G. Scofield, *and, l-r bottom, dined with company executives, and inspected the machine shop, the discovery well – Dammam No. 7 – and the first oil storage tank in Saudi Arabia.*





The New York Times.

EXTRA

GERMAN ARMY ATTACKS POLAND;
CITIES BOMBED, PORT BLOCKADED;
DANZIG IS ACCEPTED INTO REICH

line that started the oil flowing from the terminal tanks into the hold of the *D.G. Scofield*, the first tanker to be loaded with Saudi Arabian oil. The trickle that in later years would become a flood, had started.

Three months later, disaster struck. Dammam Well No. 12 exploded in flames. At the time of the explosion, driller Bill Eisler and his Saudi helper were standing on the 'stabbing board,' a plank placed above the well connections. Below the derrick floor, in the cellar of the well, a Saudi crewman waited to open a small bypass pipe that would permit pressure from the oil and gas in the well to enter the chamber above the master valve. Suddenly, as the order was given for the Saudi in the cellar to open the valve on the bypass pipe, the world exploded: flames shot upwards, Bill Eisler jumped and, terribly burned, started to crawl to safety.

Saudi crewmen, rushing to help, were able to pull Bill's burned body clear and to lift him onto a pick-up. But it was too late. Bill, like the crewmen on the derrick floor and in the cellar, died, and within minutes the heat of the fire melted the steel derrick legs, causing the structure to collapse.

For the men of Casoc, the fire was a disaster. With a tremendous fire, a wild well pouring out thousands of barrels of oil to feed the flames and no controls on the well, the entire Dammam oil reservoir was threatened. To make things worse, Casoc's resident manager Floyd Ohliger was in Europe, headed for home leave in the United States, and Charlie Potter, the drilling superintendent, was in America.

Casoc, however, immediately began to respond. Harry Rector, acting drilling superintendent, cabled San Francisco, caught Ohliger in Rome, asked for advice from the British oilmen in Iran at the head of the Gulf, and called for direct assistance from the refinery of Bapco (Bahrain Petroleum Company) which had equipment for fighting refinery fires. Simultaneously, men such as Bill Eltiste, the service superintendent; John Box, machine shop foreman; Cal Ross, labor foreman; John Ames, drilling foreman, and Ed Braun, plumber, set up an emergency station, a shelter and a kitchen. They also laid another line from one of the early wells that had produced only water; now the well had value. They also lined up portable steam boilers from other drilling rigs near the burning well and fed steam into the fire in hopes of driving back the flames and seeing what connections had failed.

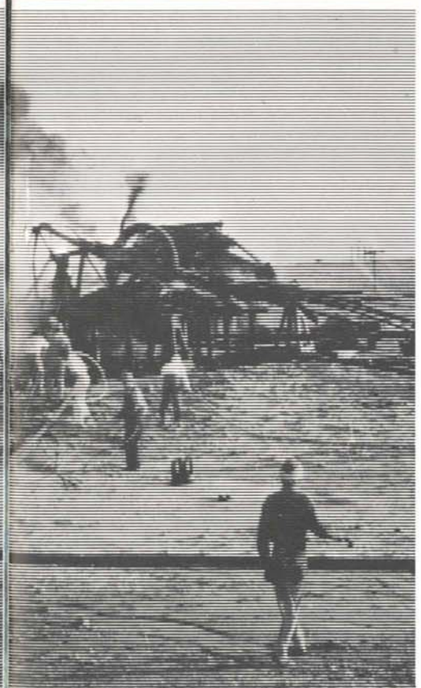
In spite of the steam, flames continued to engulf the connections at the top of the well, so John Box's machinists built a shield of sheet metal and gave it wheels. Encased in asbestos suits, partially protected by the shield, and with other men pouring water from a fire hose upon them, Herb Fritz and Walt Sims fought their way to the extension rods attached to the control valves. They found one rod bent and useless. They managed to turn the other about two revolutions before it stuck and they were driven back by the heat. Next day, four men armed with a long wrench continued the effort and managed to close the valve partially before the rod broke and they were dragged back from the mixture of steam and fire. But their effort had paid off.

"From San Francisco, meanwhile, Socal, which had been sending advice by radio and fire-fighting equipment by plane, sent word that Charlie Potter, the drilling superintendent on home leave, and Myron Kinley, famous battler of oil well fires, together with a team of fire-fighting specialists, were flying to New York en route to Saudi Arabia to stop the flow of oil and gas and the resulting fire. The men of Casoc were not overjoyed. By now, the massive torch had become the personal adversary of the Casoc field organization. Coming from every department, men had given their contributions, facing searing heat, the loss of hearing – because of the shrieking jets – and, even the threat of death. Were outsiders now to come in and apply the coup de grace? Ed Braun is reported to have stated the field attitude when he grunted, 'Nuts! This is our fire.'

Both San Francisco and the field force recognized that one way of ending the fire would be to somehow drill a hole in the casing, or one of its remaining effective connections, and then pump drilling mud

Top: Flames engulf the toppled derrick of Dammam No. 12.





MORRALL

Bottom: Fighting the 1939 Fire.

down-under enough pressure to stop the oil from flowing upwards into the flame. To achieve this, San Francisco favored a tunneling operation, exposing the casing well below the surface, but the men at the well could see a pipe connected to the casing and rising from the cellar of the well. They concluded that this was the better location for the tap, so again John Box went into action, building a tap to fit the raising pipe, and again the firefighters braved the heat of the fire to attach what they call 'a hot tap.' Under the protection of water spray, they slowly placed nuts and tightened them on each bolt, crawling away when the heat threatened to overcome them. They struggled for two days before the tap was firmly placed, but on July 18, 10 days after No. 12 had erupted, they cut into the casing and started pumping mud down to kill the flow from the reservoir, and a few hours later the fire flickered and died. The watching men, shouting and pounding each other, knew they had won.

In September, 1939, Europe exploded in war. America was not involved, and though fewer ships were available to bring men and supplies, and communications became more difficult, generally, the Saudi Arabian development continued without faltering. By early 1940, the Casoc field organization had grown to 435 Americans and 3,300 non-Americans, chiefly Saudis. Of the Americans, 45 were wives, and 16 were children. As more families arrived, additional housing was built. By then too, Saudis were moving to positions of responsibility. They were head men on drilling rigs, lead men and sub-foremen on construction, clerks in offices.

Out at the Abu Hadriya rig, meanwhile, drilling had continued – though San Francisco was again getting discouraged; the drilling bit was down below 10,000 feet (3,048 meters), more than twice the depth of the Dammam wells, but had found no oil. Hadn't the time come to write this one off as a bad investment?

In the field, Bill Scribner, the foreman, said no and, the story goes, pleaded for a few more days. Within that time, a core (a sample) of the formation was brought to the surface and turned out to be limestone saturated with oil. Bill shouted so loudly as he reported the event to Dhahran headquarters, that those receiving the message contended that Bill could have delivered his good news across the more than 100 miles (160 kilometers) of desert without radio assistance.

About the same time, in the area beyond Hofuf, chief geologist Max Steineke, after one of his roller coaster journeys through the rounded hills of drifted sand, developed the belief that he was passing over a geologic high, i.e. an area where the earth's rock layers had been raised above those around them. Just how he developed this suspicion is not clear, but his hunch must have been strengthened when he discovered a patch of rocks older than those of the surrounding surface.

"In any case, on his recommendation, the company moved into the area with structure drills. Their shallow holes confirmed Max's suspicions that there was a structure, or arch, in these rocks, and confirmed again Max's reputation as a geologist of unusual ability. Indeed, his recommendation on this was an important part of the Saudi Arabian achievements that later brought him an award for having discovered more oil than anyone else in the history of the industry.

On October 19, 1940, as the drills gnawed their way through the Abqaiq rock toward what would be another important discovery, Bill Palmer and Bill Burleigh, being of nocturnal persuasion, had retired to the upper floor of the Dhahran clubhouse after most members of the community had gone to bed. This was a night for contemplation and the pursuit of peace. The stars hung low, small satellites to a moon that painted its broad path of silver across the quiet Gulf. Though a war was raging in faraway Europe, the world of Dhahran was at peace.

Then, in the stillness, they heard the hum and rumble of motors. A plane was flying somewhere near – in the dark. This was unusual. Why would a plane be over Dhahran at night? Without warning, the quiet was shattered as the roar of explosions burst from the side of the *jabal* and the two Bills, startled and bewildered, were racing downstairs, where half-clad people were pouring into the streets – attractive targets if strafing were to be part of the plane's attack.

After circling a few more times, the plane departed. Examination by the light of morning disclosed that the total direct damage from the bombing was confined to punctures in two small pipelines. The inhabitants of Dhahran also learned during the following day that three other planes had dropped small bombs on the Bahrain refinery with similar lack of damage. They also learned that the planes were Italian: Benitó Mussolini broadcast a public apology to Ibn Sa'ud, explaining that the visit to Dhahran was a mistake, as the intended objective had been the Bahrain refinery in British-controlled territory, a plant that was the source of petroleum products for the British war effort in Europe.

In the late spring of that same year the

# Ohliger: "...he says, 'You're too young for the job'... I said, 'Well, I'm doing it.'

WRITTEN BY JOHN RICHARD STARKEY

*"I was surprised when they put me in charge," said Floyd Ohliger. "But I said 'thanks,' I didn't say 'why?'"*

*Ohliger, the "Manager in Residence" in Saudi Arabia when the California Arabian Standard Oil Company brought in the famous oil well called Dammam No. 7, is 82 this year, but he vividly recalls the early days in the al-Hasa region where, at the age of 32, he waded ashore, "my gear on my head, Hollywood style."*

*In those days, he said in an interview last year, "we got more practical advice from Hollywood on the conditions we would meet than we did from our own company. I didn't have any idea what to expect. There wasn't anybody around who knew the place."*

*Within months, however, Ohliger "an engaging, freckled, Pennsylvania Dutchman," as Wallace Stegner described him in the book* Discovery, *had begun to know the place quite well. Though hired as a petroleum engineer, he, like the Hoovers and Henrys, the Steinekes and Bargers, eventually did whatever needed doing – and didn't mind a bit. "I wasn't the type of fellow to stand around and say, 'Is there anything I can do?' I was one who would do this and that, and make myself useful."*

*In al-Hasa, in 1935, there were plenty of ways for Ohliger to make himself useful. First he supervised construction of a pier in al-Khobar built of "a sort of soft rock, calcarous ... that would collect on the bottom of the sea." The pier was the idea of Bill Eltiste, an extraordinarily capable mechanic, driller and rig builder, later a hero in the great fire at Dammam No. 12. Tired of landing material way down the coast Eltiste suggested construction of a pier at al-Khobar. "Well, they looked around and ... Eltiste said to me, half joking, 'You know, Floyd you're going to build that pier.' And I said, 'Sure, I'll build that pier.'"*

*Pier construction marked another important milestone: the first mass employment of Saudi Arabs by the industry that, 50 years later, they would take over and run themselves. Ohliger engaged them to gather and move – in dhows – the calcarous rock from the bottom of the Gulf, then pile it up in two parallel walls that slowly poked out into the green water.*

*Ohliger was useful in other ways too. He helped sink a water well for Casoc's encampment inland from al-Khobar, and later, in 1937, participated in construction of the first real homes and bunkhouses put up in Dhahran. He and his wife Dorothy – met and courted in the Levant, where "Krug" Henry had courted Annette Rabil earlier – were also among the first married couples to move into those houses – as Dhahran began to change from mining camp to desert suburb.*

*Soon Ohliger became even more useful: he was put in charge of Casoc's operations in al-Hasa – over the objections of at least one Socal executive who met Ohliger in London. "'So', he says, 'you're Floyd Ohliger?' and I said, 'Yes.' He was quite a guy. He looked at me and he says, 'You're too young for the job,' and I said, 'Well I'm doing it,' and that was all." Ohliger, furthermore, kept doing the job; when he retired in 1957 he was an Aramco vice-president and a member of the Aramco Board of Directors.*

*During those early days, Ohliger, once he was in charge, began to see a lot of King 'Abd al-'Aziz – and to develop a deep respect for him. "King 'Abd al-'Aziz would have been a great leader any time in history," Ohliger said. In turn, the king liked and respected Ohliger – particularly when Ohliger began to travel regularly to Riyadh to discuss problems with the king on a face-to-face basis.*

*Ohliger, who visited Dhahran last year as the company's golden anniversary celebration was getting underway, made it clear that he thought the real heroes of the pioneer period were the geologists – especially Max Steineke, the man who insisted that Casoc keep drilling at Dammam No. 7. But he also suggests that he personally was optimistic from the drilling of the first well. "It was evident that there were hydrocarbons down there someplace ... so I never lost my optimism."*

*In that, Floyd Ohliger was like the other pioneers: despite the size of the challenge and the problems that plagued them, they never lost their hopes for success – and as a result found the world's largest oilfields.*

*King 'Abd al-'Aziz shares a joke with Floyd Ohliger.*

war came closer still. In Iraq, just to the north, the Iraqi army besieged the British airbase at Habaniyah. The siege was broken only after a British relief force arrived. Recognizing such growing threats to peaceful operations, Casoc owners decided that Saudi Arabian activity should be reduced to the minimum required by the concession agreement and so the evacuation began – the last group of wives departing for home in May, 1941. What we would call 'the time of the Hundred Men' had begun.

It was not too soon. On December 7, only seven months later, Japan struck at Pearl Harbor and overnight this small outpost of an American industrial organization, joined to the San Francisco parent by steamship and plane, was immediately cut off. Thereafter, food, tools, other supplies might trickle in – or might not.

This wasn't apparent in Dhahran at once. Manpower had already been reduced to near minimum and though shortages existed, they were not serious. The initial reaction to Pearl Harbor was surprise and outrage, but not panic, and if exploration and production faced limitations, there were other things to keep the 'hundred' busy. The holding period in Saudi Arabia provided the Casoc manager and his advisers with the rare opportunity to analyze programs for public betterment – some of which had been inaugurated in previous years – and to make plans to expand those that had shown favorable results.

During this period, the Americans came into even closer contact with their Saudi hosts – as their anecdotal history suggests. Les Snyder, later to be an Aramco vice-president, never forgot the ability and determination shown by one young Saudi who had been trained by the company in the operation and repair of tractors. One day, driving one of Casoc's battered cat tractors, with steel treads poorly suited to desert travel, the young man discovered that the machine had developed a leak in the fuel line, 100 miles from Dhahran (160 kilometers). His repair equipment included some rags, his lunch and his ingenuity. From his lunch, he obtained some dates and made a poultice of mashed dates which he applied to the leaking fuel line, and tied in place with a bandage of rags. The bandage failed frequently, but the young man continued to replace and adjust it and after four days of struggle, he brought the reluctant tractor into camp.

Another Snyder anecdote shows the basic honesty that was standard in those early, simple days. Charged with getting hold of a consignment of 350,000 riyals in cash (close to $100,000) for company use, Snyder went to Riyadh. His guide, who had been instructed to conduct him to a certain money changer, brought him on foot through the crowds and confusion of the streets to a man named K'aki. Les had never heard of K'aki until he received a chit, a small piece of paper, addressed to this man. But in a small shop several Saudis examined the chit that Les presented, finally appeared satisfied, opened a door to an adjoining small mud walled building to reveal piles of gunny-sacks filled with coins.

Next they moved into the crowds and started hiring men, apparently at random, to carry the sacks to Snyder's truck which was parked some distance away; it could not get closer because of the narrow, crowded streets. Soon, about 20 such men began to shoulder the sacks of coins and to move off individually through the milling people.

Les was confounded. What should he do? How could he keep track of 20 men, amid teeming crowds, each going his own way? What was to prevent any one of them from disappearing down a side street with his sack of coins? But, faced with no reasonable alternative, Les resigned himself to trust and returned to the truck where the sacks were being dumped into the truck bed. Eventually the sacks stopped coming, the money changer indicated that the delivery had been completed and the truck, loaded with the money, departed across the hundreds of miles of open desert for Dhahran – where the accountants checked and found that not one coin was missing.

"By 1942, Saudi Arabia was feeling the impact of the war. Shipments of rice, a staple of Saudi diet, no longer were received from Burma, because of the Japanese invasion, and prices were rising alarmingly. In response, the king was urging Casoc to employ more Saudis, thus distributing more money to the people. From that request – plus a shortage of parts and tires for Casoc's sedans – came the famous episode of the 'camel haul,' by which Casoc supplied one of its drilling operations. Who had the brainstorm isn't clear, but again Bill Eltiste probably contributed. Certainly he was involved – as was Khamis ibn Rimthan, the Saudi who performed so effectively as guide for the geologists over the years. Although he was a government employee, Khamis seemed available whenever the company needed him. This time Khamis was asked to accept a contract to haul supplies by camel for about 30 miles (48 kilometers), from the company storage yards at Dhahran to the drilling site at Abqaiq No. 3. He would be paid an amount approximately equal to the cost of transporting the same material by truck. Management suggested


The New York Times.

JAPAN WARS ON U. S. AND BRITAIN; MAKES SUDDEN ATTACK ON HAWAII; HEAVY FIGHTING AT SEA REPORTED

that he go up country and recruit owners of camels, asking them to bring their animals to Dhahran to haul supplies to Abqaiq. He would decide what he would pay the owners from the money that he would receive from Casoc.

Khamis agreed, provided that he could obtain the needed recruits, but after about a week of travel through that portion of desert where the tribes were enduring the summer, he returned discouraged. The more affluent Beduoins, with the stronger camels, didn't need the money and those with lesser possessions and poorer camels concluded that their stock couldn't stand the 30- to 70-mile (48- to 112-kilometer) journey in the heat.

Casoc's management persisted. If the Bedouins would not come for what Khamis had offered them from the contract money, would they come for the *full* contract sum – with Khamis receiving full salary in addition from the company? Again Khamis agreed to try.

After this second effort, he returned with promises for 75 to 100 animals. Cal Ross, the company's representative, was assigned to work with Khamis to arrange supply dumps and other facilities, and the accounting department was asked to devise procedures for paying the Bedouins. Cal planned to transport sufficient supplies to meet the needs of the drilling operation for a month or two, and calculated that this would provide possibly two weeks' employment for the anticipated 75 or 100 camel-drivers.

On the day before the first haul was to start, the camels began to collect in the open area beyond the storage yard. Soon the expected 100 were there – but the camels kept

coming. They kept coming, in fact, for two full days until about 500 darkened the rocky plain, thereby providing Cal and Khamis with a crisis. They had expected to provide work for a week or so to 100 camels and their drivers and now they must share that employment among five times that number. In fact, they had to make hurried additions to their supply dumps to provide all animals with *one* load.

"Unfortunately, Cal and Khamis were not alone in appreciating the situation; the drivers did too, and concluded that whoever reached the head of the line first would find cargo for his camels, while he who reached that point last might not be so fortunate.

In minutes, as a result, the open space beyond the storage yard erupted. Drivers struggled with, and shouted at, camels to persuade them to kneel, causing the camels to bawl some more. Squabbling drivers tried to force their camels ahead of others, as they all strove to reach the storage yard entrance where loading was being conducted.

At the loading area, the protesting camels again were persuaded to kneel to permit their masters to place the sacks and drums on the pack saddles and to lash them in place. A weak camel could carry two sacks, each weighing nearly 100 pounds; a very strong animal could manage five. A weak camel could carry two 15-gallon drums of gasoline or oil, but most camels carried three, with one lashed between the two on either side. But then as the loaded animals were urged to arise, many camels protested on general principles, contending that the load would kill them. The drivers tried to ignore these protests, insisting that the surly beasts get up and start walking, but some of the strong-minded animals won the argument simply by refusing to move until their masters removed part of the loads.

And so the first morning of loading progressed. Each driver was given a chit for each sack or drum that his camel carried. At Abqaiq, the toolhouse foreman would sign the chits when the loads were delivered. When the driver returned to Dhahran and presented his chits at the booth set up by the accounting department, he was paid for his labors.

As the day progressed, the open desert near Abqaiq became dotted with small clusters of camels and drivers. They would move slowly for a few miles in the midday heat, then the loads and saddles would be removed from the animals, permitting them to seek such skimpy wisps of dried grass as might remain between the rocks. All would rest until some time in the very early morning, when they would resume the journey in relative coolness and reach Abqaiq that afternoon. After the loads were delivered, the camels would be watered before they were moved a short distance and the pack saddles again removed for the night. Long before morning, the caravans would be on their return journey to Dhahran.

When the camel haul first was considered, some Casoc people feared that it might result in a major loss of valuable supplies. But the fears of loss proved groundless, and after the first deluge that inaugurated the project, the number that answered later calls dropped markedly, but remained adequate to satisfy company needs. Les Jorgenson is credited with producing a large, professionally lettered sign that was mounted behind the camel loading area. It read, *WE WALKEM TRANSPORTATION CO., KHAMIS BIN REMTHAIN GEN MGR*. Despite the spelling, Cal and Khamis grinned when presented with this evidence of their business status, as did all who came to watch the show.

Like the Saudis, the Hundred Men also had to cope with food shortages. One of their solutions was Steve Furman's farm. Nominally in charge of the commissary, Steve Furman, during the time of the Hundred Men, became a skilled farmer and rancher, who supplied Casoc with vegetables and meat.

The farm came first. In a suspiciously green patch of ground on what used to be the al-Khobar road, Furman plowed, seeded and planted and irrigated – and came up with crop after crop of carrots, onions, tomatoes, lima beans, cucumbers and even sweet corn. Then he started a ranch – stocking it with rabbits, pigeons, sheep, goats, and camels – built an incubator and began to enlarge and improve the breeding of all those animals. By the end of the war Furman's Ranch counted 6,000 chickens, 2,000 pigeons, 500 rabbits, 500 sheep and, a highlight, 1,200 cattle – the result of a startling proposal put forward by an ancient Saudi named Mutlag. He proposed to journey into Yemen, where cattle were raised in watered lands beside the Red Sea, and collect cattle and drive them overland to Dhahran if Steve Furman would promise to buy them when they arrived.

Steve, noting that between Yemen and Dhahran lay over 1,000 miles (1,609 kilometers) of mountains and deserts, wasn't sure whether Mutlag was crazy or not, but concluded that this ancient desert traveler might possibly be able to make the drive; moreover, if he failed, what had Steve to lose? He promised to buy on delivery.

There followed what Wallace Stegner in his book, *Discovery*, describes as a drive that rivaled the great exploits of the American cattlemen who pushed their herds from Texas to the Kansas railhead in the years of our western expansion. Those men of the west had money, experienced cowboys, trained cow ponies and, above all, a welcoming land in which to travel: plains covered with grass on which the herds could graze as they moved. Mutlag had his young son, his aging legs and a harsh land on which no cow could survive for long except in the oases scattered along the route.

In Yemen, where he had friends, Mutlag collected his cattle and in January, 1942, started his drive. He worked his animals along the edge of the Tuwaiq mountains, then left the high country to reach al-Kharj, then crossed the desert to the great oasis of Hofuf. He was months en route, as he was forced to rest his herd after it reached each oasis, permitting the animals to eat and renew their strength.

"The last leg of the journey must have been the most difficult of all. From Hofuf to Dhahran little grass grew, even in the times of the winter rains. Presumably, Mutlag counted on those meager blades and the ability of the herd to exist with little water while it traversed the last 150 to 200 miles (241 to 321 kilometers).

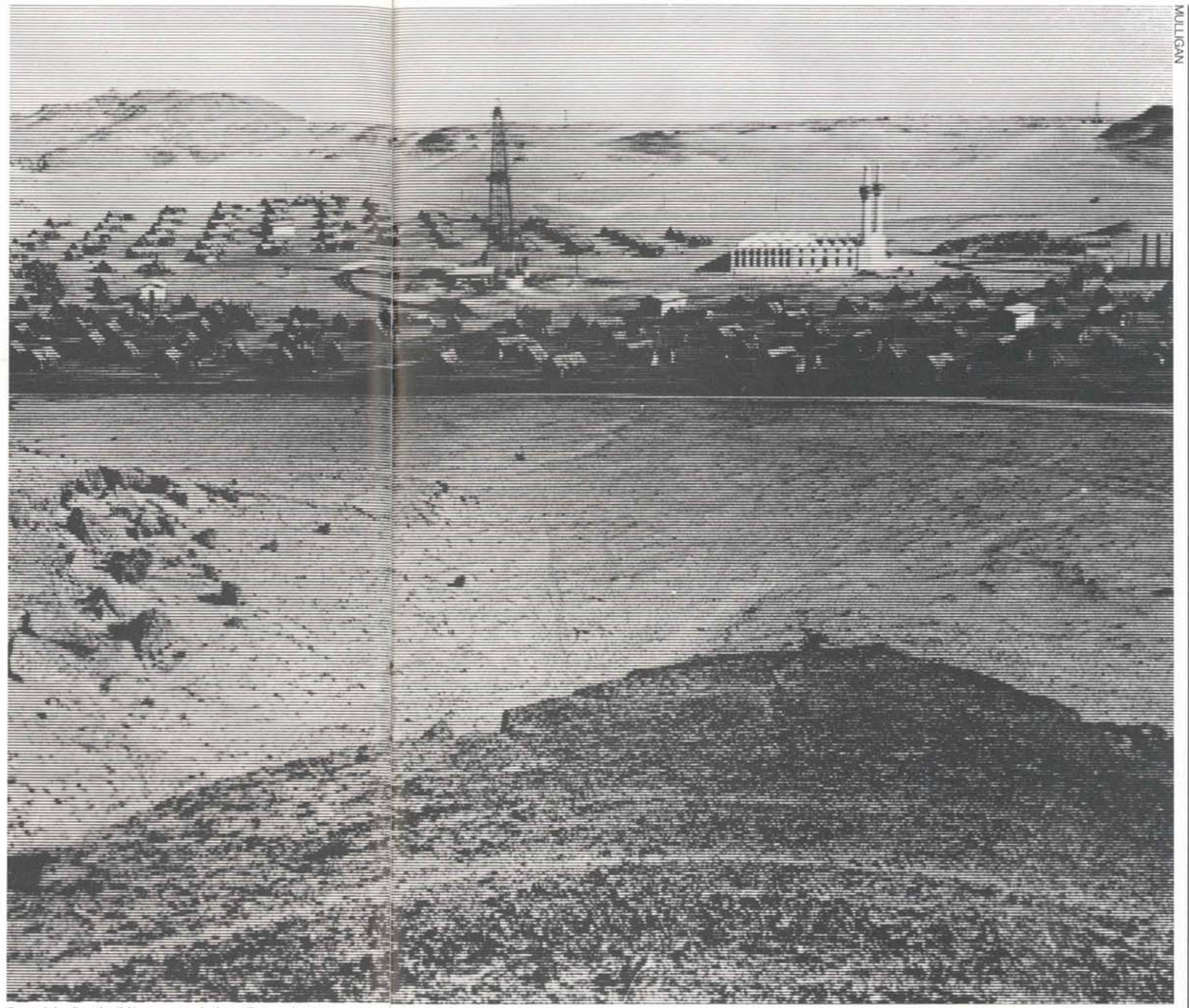
But in spite of the hazards, Mutlag did deliver, though possibly 75 to 100 out of a starting herd of about 150 actually reached Dhahran. Miles Lupien contends that the cattle were so thin they had to be given muddy water to drink to permit them to become visible. But to Furman they were the beginnings of a herd. And Mutlag must have found the venture profitable, for he repeated the drive during the following winter when the need for his replacement stock was of growing importance. He skipped the winter of 1943-1944, then tried again in 1944-1945. But that was a terribly dry year and most of Mutlag's cattle died before reaching Dhahran.

In retrospect, the holding period – the time of the Hundred Men – seems a long as well as a romantic period. Actually, I know, it was quite short. By early 1944, in fact, it was over. Casoc, for instance, became the Arabian American Oil Company – Aramco – and instead of organizing camel hauls and cattle drives, we began to plan programs of expansion. Soon new arrivals, strangers to the Saudi Arabian experience and the philosophies it had created, began to appear – the first trickle in the flood that would engulf us in the coming months.

"Prior to the start of that flood, however, management took time to review our performance – and was pleased, I think, with the 10 years since the concession was signed. Less than a year after the first geologists entered the vast, undeveloped desert, Casoc selected the location for their first wildcat, or test well, and within four years that location turned out to be in the center of a commercially productive oil field. Thereafter, two more fields were discovered, one of which gave promise of major rewards. The geologists also had discovered evidence that caused them to believe that the oil accumulations of eastern Saudi Arabia might be far more extensive than these promising beginnings – as they were. The first Americans had also developed a sound working relationship with the Saudi government and its people and had demonstrated their concern not only in finding oil but in developing a nation. They had set up a progam to train Saudis in the skills of modern industry. They had established hospitals – still on a modest scale but the beginnings of what would become a greatly enlarged program of medical care. They had attacked the scourge of infectious diseases that plagued the public, made more water available to this thirsty land – by drilling wells in accord with government wishes – and had provided key ingredients to a major government agricultural project as well as assistance to the government transportation system.

At the same time, they were establishing programs of assistance to the public that would be developed fully in later years: programs to help Saudi communities with public works, to help Saudi employees buy or build modern homes – financed by subsidized loans – and to persuade and assist many of the company's best employees in becoming independent contractors.

Above all, the Hundred Men held on. They maintained the petroleum operation and despite the handicaps of war helped lay the groundwork for the extraordinary achievements of the post-war period. Their story is not the performances of heroes or supermen; they were not. They were simply a small group who shared a common objective and possessed the perseverance and ingenuity to achieve it. In this spirit, it is a bright chapter in the story of one American corporation that combined humanitarian and industrial objectives, and found them to be compatible.

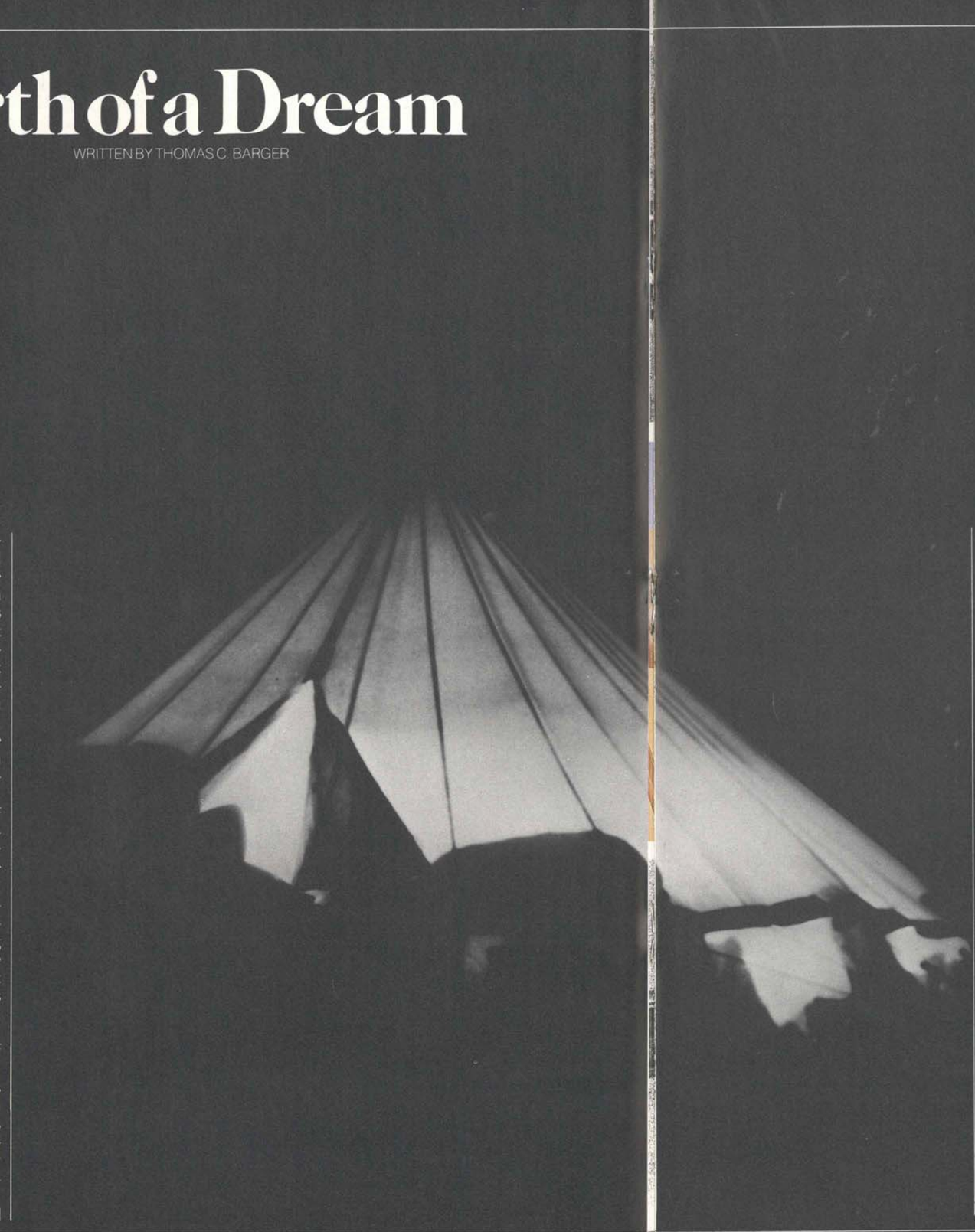


MULLIGAN

*One of the first buildings erected after oil came in was a mosque for Saudi workers.*

# Birth of a Dream

WRITTEN BY THOMAS C. BARGER



"I arrived in Saudi Arabia on December 13th, 1937. I was hired in San Francisco allegedly to be a surveyor for a seismograph crew. They were very short of surveyors and needed me badly, so I was rushed out to Saudi Arabia in 13 days, which was a record for the time. But when I met Max Steineke [the chief geologist] he said: 'Hello, sure glad to meet you, glad to have you here. I don't know what I'll do with you yet, but I'm sure glad to have you here.' He didn't say anything about surveying for a seismic crew. He didn't need one very badly, and he made me a junior geologist.

When I got there, there was a cloud of gloom hanging over the place. That was because they had drilled 10 wells; that is, they had drilled on Jabal Dhahran, which later became the Dammam field, and they had drilled a wildcat at al-Alat, which was absolutely dry. The holes in Dhahran had produced some oil and a little gas, but nothing in commercial quantities, and they were deepening No. 7 because it was in the best shape to be deepened, to see if there was something deeper than the zone which was producing oil in Bahrain. If there had not been, it's quite likely that Standard of California might have left Arabia.

Max Steineke didn't seem to share this pessimism. He'd been across the peninsula in the spring of 1937 and spent three weeks getting back from Jiddah with Floyd Meeker who was the chief mechanic. They roamed around from Jiddah to the Dahna – an area of desert sands 100 miles from Dhahran – with Max observing rocks and dips, and when he came back he wrote a paper on the geology of Saudi Arabia. That was the framework for all subsequent efforts by the geologists. It was a most remarkable accomplishment. Max had visions of all these rocks, limestone, sandstones, all kinds of good rocks that are associated with oil, and if they didn't find oil in this hole, then undoubtedly there would be other places you could find oil. But it was said that within the board of Standard of California there was great infighting between those who wanted to continue in Arabia and those who weren't going to throw any more of their money down a hole half a world away from San Francisco. Then No. 7 came in, in March of 1938, and I stayed 32 years instead of just that one year before getting sent to the Dutch East Indies.

I was a geologist. Max had two others: Jerry Harriss and Walt Hoag, operating as a field party. All the others, the first wave of geologists which had done the premier work, had gone home. They'd been three years in Arabia, and the only ones left were Max Steineke and ' Krug ' Henry, and Krug left shortly after that. Max had these two geologists, and they weren't speaking to one another, and they hadn't spoken to one another for months during the previous field season. I think Max knew perfectly well what he was going to do with me. If I looked like I could do anything at all, he would replace one of these men with me and we'd have a new team together. So he sent Walt Hoag to Jiddah and put me out in the desert with Jerry Harriss.

*[After a brief stint in the area around Salwa, Barger and Harriss were sent to the Rub'al-Khali].*

We spent four months in the desert and never came into Dhahran. We were to explore the southeastern Rub' al-Khali at a time when nobody knew what was there. As we went further the sand dunes got thicker and thicker, and higher and higher, and we learned more about sand than anybody had known before – especially when you had to run in front of the cars to find some solid sand you could operate on. Finally we got as far as we could get with the equipment we had, and Max came down with two more pickups. We had established some watering holes and we had run the assault on the southeastern Rub' al-Khali, but we didn't make it. We had arrived at a point where we could see that we could go down the slopes, but we'd never get back up them. And of course although we did have low-pressure tires on the sedans and the pickups, they didn't compare with what people use in the Rub' al-Khali these days. I learned a lot of Arabic in those four months.

"The great thing about field work was that much of the time you were away from your established camp, so you carried a tent with you, but you never pitched it unless it rained or something, and so at nightfall you didn't have anything to do except sit around the campfire. We didn't carry any lamps with us. This gave me a great opportunity to listen to people talking Arabic. One thing about the Arabs, at least the

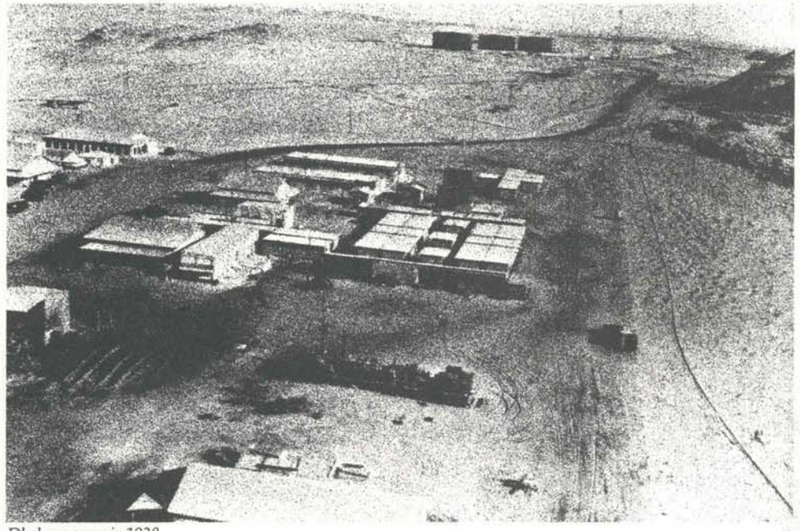
ones I knew, is that they'd help you learn Arabic. They would put me down like they were training a hawk. You train a hawk by putting him on a pedestal and yelling his name at him day and night, hour after hour. They'd get me down with such words as *mahfuz*; I couldn't pronounce *mahfuz* at *all*. And that was fun. I told them about Custer's Last Stand and the Wooden Horse of Troy and such matters.

We had three exceptionally good guides. One of them was Khamis ibn Rimthan. He had been assigned to the first field party that went out from Jubail in 1933 because he was known as a good guide; in fact, Khamis was the guide of all guides. When you got a new guide, you gave him to Khamis and Khamis decided whether he was trustworthy. And then we had two other guides, both of whom looked like figures from Biblical times. Salim Aba Rus had been sent down by Sa'ud ibn Jiluwi – governor of al-Hasa – to join us when we were at Salwa. He was an 'Amiri tribesman, while the other, 'Abd al-Hadi Jithina, was from the Al Murrah tribe.

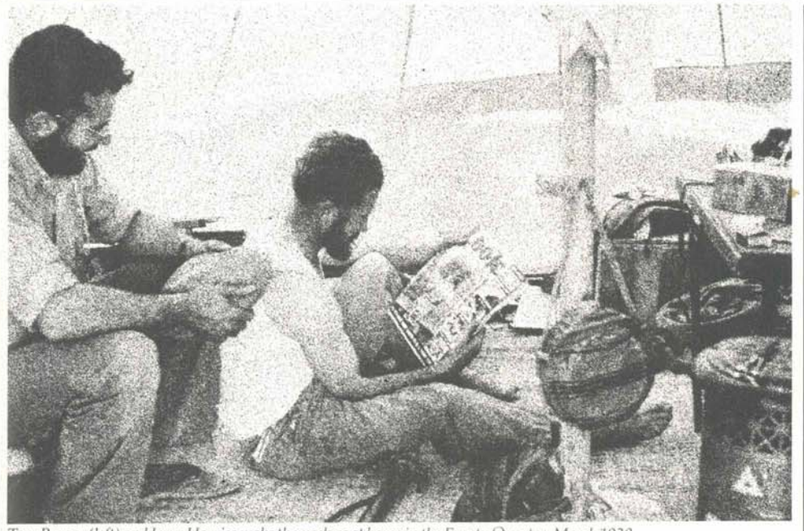
But none of them compared with Khamis ibn Rimthan, although I must say 'Abd al-Hadi ibn Jithina and Salim Aba Rus were tremendous.

Khamis had a form of simplified Arabic, a whole vocabulary he knew Americans like Steineke and Jerry Harriss could comprehend. He simplified everything. You can get along very well with circumlocution in a language if you're imaginative. Tom Koch had this gift. Max Steineke said he knew a lot more Arabic than Tom did, but he couldn't talk it as well as Tom could. Tom had mastered the art of using his vocabulary in such a way that he got his message across. Khamis would make it simple for you. For Max, everything was in the second person singular. He didn't know the difference, and Khamis knew he didn't know the difference, so it was all right. They worked out the vagaries of Arabic grammar with no problem. As long as you had a verb of some kind and either the singular or the plural of the noun, why he made allowance for that too, automatically.

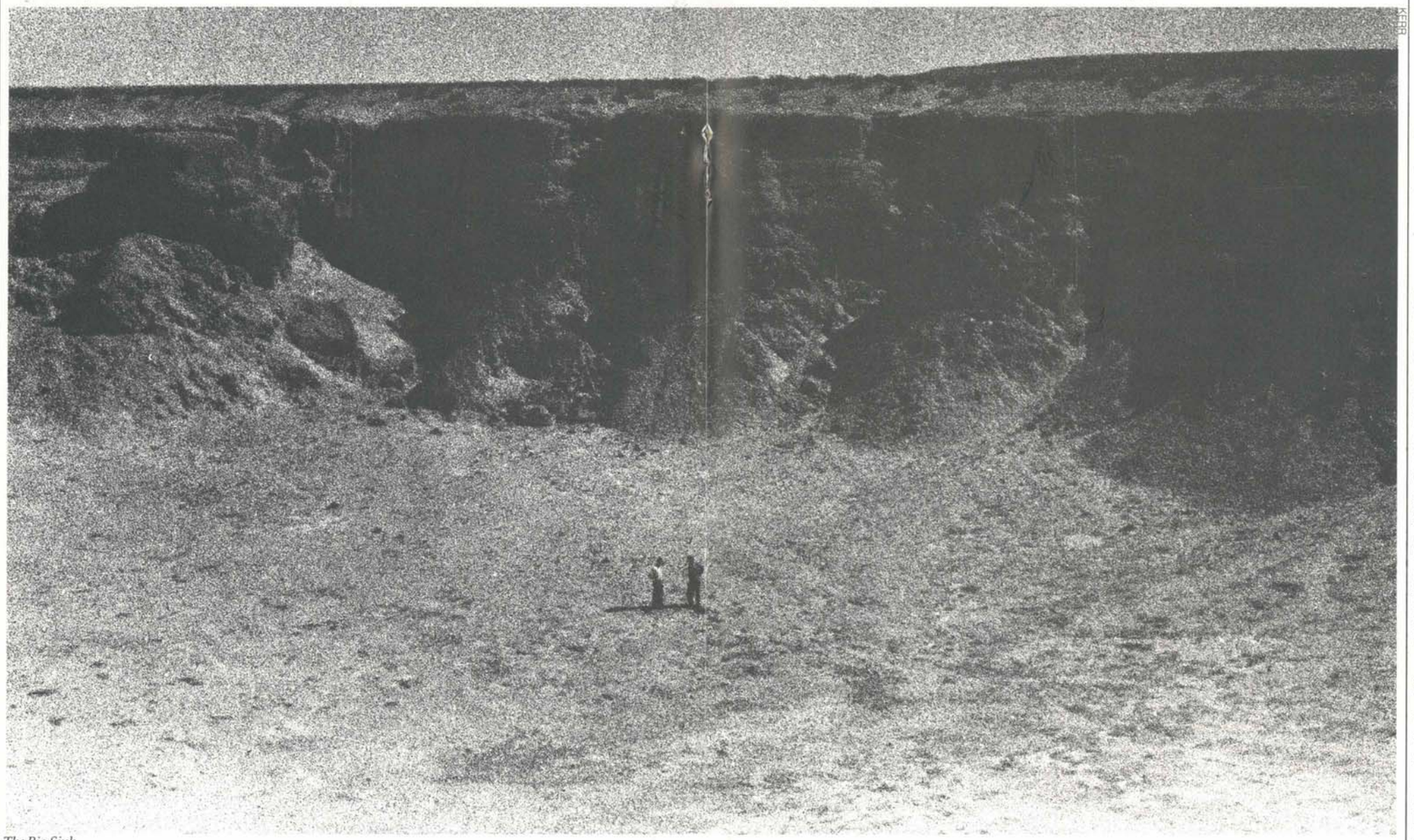
One time we were looking for a place called Wanan on the map. We drove all around, knowing it had to be within three or four miles of where we were. The guides said, 'No, there is no such place.' We were exasperated. How could we be so stupid? Finally it dawned on me that the guy who had written down this place name might not have doubled the 'n'. So I said, 'Surely this place has to be here. It says Wannan is right here.' 'Oh, Wannan, Wannan,' said the guide, 'Why didn't you say so?' The difference between Wanan and Wannan. A black ace is not the same as a black case.



*Dhahran camp in 1938*



*Tom Barger (left) and Jerry Harriss make themselves at home in the Empty Quarter, March 1938.*



*The Big Sink.*

*[Barger and Harriss' four months in the Rub' al-Khali eventually resulted in a detailed report on the area:* Geology of the Rub' al-Khali and Adjacent Portions of Southern Arabia. *It dealt with the physiography, stratigraphy, structure, historical and economic geology of an area covering almost 40,000 square miles. The two geologists only learned of the discovery of oil in commercial quantities when Max Steineke drove down in March, 1938 and told them that Dammam No. 7 had come in.]*

"When we came in from the field in April, the place was alive with men laying out storehouses and roads and stabilizer sites, determining where to lay the pipelines, and so forth. Although they were still very cautious, part of the ground work was done on the assumption that No. 2 well would come in as an oil producer – which it did.

*[Barger now realized that it was unlikely that he would ever be sent to the Dutch East Indies. Until America's entry into the war, he continued his exploration and mapping activities in the north around Ma'qala, Abu Hadriya and the Khurma Karim domes, whose structure had "bothered" Steineke, and which were subsequently found to be non-oil bearing surface features. Barger – to the considerable amusement of Khamis ibn Rimthan – also prepared an appendix to the geologic report on the Rub' al-Khali, on the Arabic names of plants and animals and a list of geographical names. By then, Barger was one of the few "veterans" left.]*

In 1939 I was sent to Ma'qala with Ernie Berg. Max Steineke visited Ma'qala on his way back from Jiddah, but he didn't have time to really look at it. I was the only one of the old-timers left. Jerry Harriss was out of the picture because he had had an operation for hemorrhoids and fallen in love with the nurse. It took him forever to finish the report on the Rub' al-Khali. I had done the maps and all my part of it, but he hadn't done the geology. Years later, running across Max's weekly letters to Nomland in San Francisco, I read: 'Harriss is working on the Rub' al-Khali report.' Next week: 'Harriss is making significant progress on the Rub' al-Khali report.' He wasn't in any hurry to finish. And that left me taking a new team of geologists out into the hinterland.

I'd been up north helping with the triangulation station. Max called me in and said, 'I want you to go up to Ma'qala and see what's happening there. I didn't have time to look at it, but there's something funny there. You go and find out what it is.'

Those were my instructions for five months of work. I said, 'Well, where the hell is it, Max?' 'We'll get you a guide,' he said, 'we'll get you a guide and he can find

The New York Times.

U. S. DECLARES WAR, PACIFIC BATTLE WIDENS; MANILA AREA BOMBED; 1,500 DEAD IN HAWAII; HOSTILE PLANES SIGHTED AT SAN FRANCISCO

it.' So we went out and found what was happening at Ma'qala.

"Dick Bramkamp was chief paleontologist and later chief geologist; he succeeded Max when Max died in 1952. He was a great guy and a very good scientist. He was very helpful to all of us. I had no paleontology at all, except what I had learned from books. We eventually mapped a structure at Ma'qala. Bramkamp was of inestimable value to us, because we were dealing with Eocene limestone and there weren't any very clear markers in the limestone we could see. Dick came out from time to time and spent two, three or four days with us, examining rocks and looking at small fossils. This enabled us to identify a couple of marker beds. Otherwise we would not have been able to delineate a structure.

Sinkholes were very useful, because you had an opportunity to look at rocks you couldn't have looked at otherwise. I'd climb down, crawl around, knock off samples and then locate them on the map. Bramkamp would come and look at the fossils. He found a tiny one we called the nutmeg stone. It looked for all the world like a miniature nutmeg. It was yellowish brown. The nutmeg zone was very useful to us; you could map it and roughly tell the underlying structure. Ma'qala was also great for my Arabic because I didn't have Khamis and none of the soldiers spoke any English and had had no prior association with Americans. If you were going to speak Arabic, by God, you spoke *Arabic*. You sank or swam.

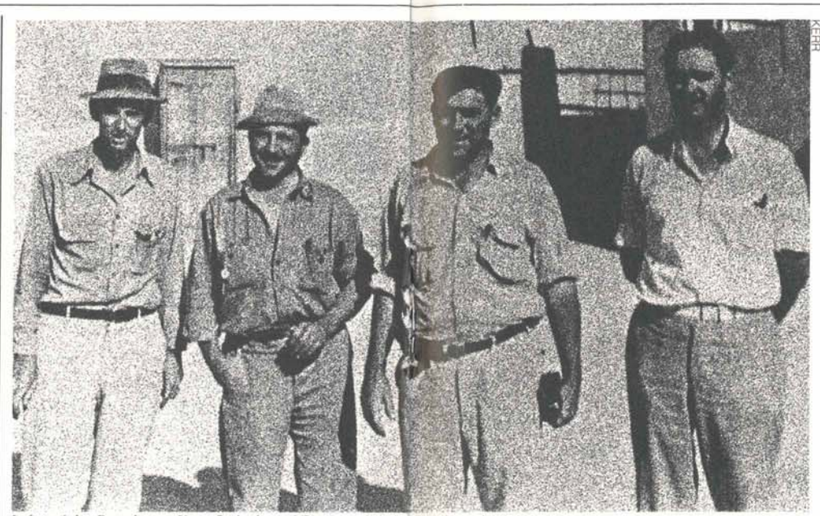
I think it was at Ma'qala that I first met the king. We didn't have much to show him except a radio that didn't work very well and a gravity meter. The gravity meter was an impressive looking thing. It was in a trailer and had lots of dials and knobs. The king and the crown prince arrived and we were going to show this to them. The king said to the crown prince, 'You get in first.' 'No,' the crown prince replied, 'I don't get in first. You're the majesty, you get in first. Besides that,' he said, 'I don't understand these things.' 'I don't understand them either,' said the king. But they went in and looked around.

In 1941 the geology program was shut down because of the war, particularly the fighting in North Africa and the troubles in Iraq. All the field geologists had gone home. I was the only one who came back from leave in 1941. I left San Francisco in February and arrived in Saudi Arabia in May. The only ones there were Dick Bramkamp, a paleontologist, and Max, who was chief geologist, and two seismic people. Just after my arrival, Max – to the horror of Dick Bramkamp – embarked upon a report on the geology of the region lying between the Rann of Kutch to the east, Cyprus to the west and the Ural mountains to the north. Bramkamp was utterly appalled. 'We haven't got any literature, Max!'

All we had was a little geological laboratory and a library you could fit in a small bookcase. Max, undaunted, kept on the project. This perfectly illustrates the difference between these two men. Both were tremendously competent geologists. Dick was never willing to commit himself until he had nailed down every last shingle. He went to his grave having never written down all he knew, because there was always one more piece of information that he had to get. Max, on the other hand, periodically wrote down everything he knew. If his successors found that he was utterly wrong, that was fine with him.

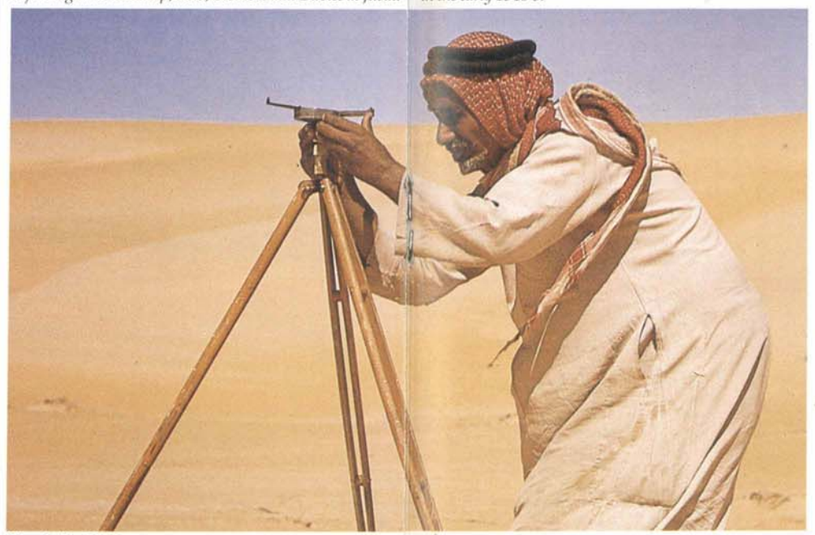
I learned more geology in that six- or eight-week period than I learned in the two or three years I'd been in Arabia, because Bramkamp and Steineke got into the most awful shouting matches about geology and I was the referee. Besides, I could read Max's handwriting, which was execrable, and I read his drafts and helped out the typist.

I first met Sa'ud ibn Jiluwi, the governor of al-Hasa, on my second field trip in the fall of 1938. He was famed for his taciturnity. One time we went to his *majlis* in Hofuf. It was a long room on the second floor. He sat on a chair at the far end with chairs all along both sides occupied by his *khuwiya* or guards. I said, *'as-salam 'alaikum'* (peace be upon you), and he said, *'wa 'alaikum as-salam'* (and upon you be peace). We went

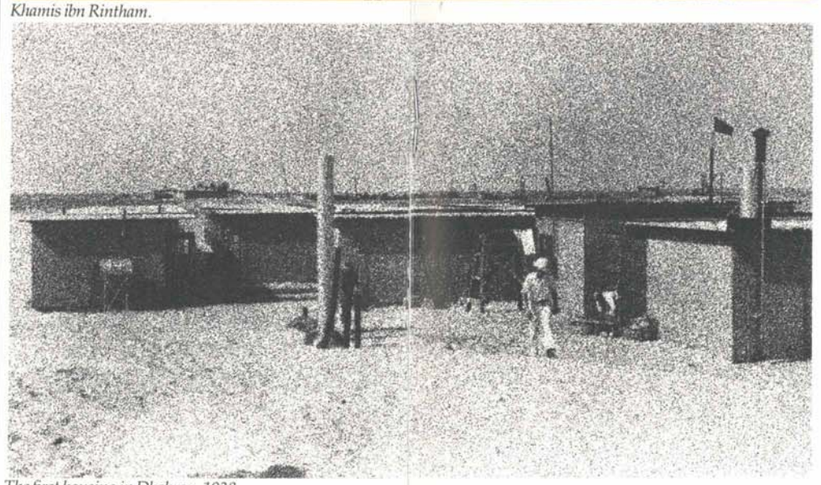


KERR

*Left to right: Bramkamp, Kerr, Steineke and Davies at Jubail in the early 1940's.*



*Khamis ibn Rintham.*



*The first housing in Dhahran, 1938.*

# Khamis: "The guide of guides"

WRITTEN BY WILLIAM TRACY

"*Khamis ibn Rintham,*" *recalls Tom Barger,* "*was the guide of guides.*"

"*If you asked Khamis, 'How far is it from here to the top of the* jabal *over there?' he'd say, 'You mean straight across or by the road?' and . . . if he was familiar with that neighborhood . . . give it to you within a few meters. Khamis was one of the few who knew numbers, in the sense of knowing them exactly. One time . . . down . . . in Wadi Sulayyil, we were guessing how far it was to Dhahran, and Khamis guessed 500 miles (800 kilometers). As far as our map was concerned, it was about 530 (850). And the only reason he was off, I'm sure, was because the direction of the prevailing wind had changed a lot by the time we got down there. He came to me when we were there and said, 'Is the North Star always in the same place in the sky?' And I said, 'Yes. As far as you can tell with the human eye, it's in the same place.' He said, 'I thought that was so, but you know down here I look up to the North Star and I'm a little bit off. It looks over here instead of over there.' He was serious. When he looked up to find the North Star, it wasn't where he* expected *it to be. And I'm sure that the problem was that there had been a shift in the general wind direction, and the direction of the dunes and the sand build-ups behind the bushes had changed.*

"*I used to ask Khamis how he could find his way from one place to another in the kingdom. If I told him that I wanted to go to, let's say, Wadi Ranya, in the Hijaz, what would he have to do to find his way there? He said he'd have to have two good men and time to interrogate them. If they were good men he could find it. But they had to be* good.

"*Khamis was always full of jokes. Once when Les Snyder and I were going to al-Kharj, the local government representative asked us if we would take along Yusuf, a young Saudi who'd been schooled in India and was trying to get to Jiddah. We said sure. So we started out for al-Kharj . . . and Khamis found . . . that this young man didn't know* anything *about Arabia. And so then they started discussing the Bedouin – how they acted and so forth, and what about game? Well, said Khamis, the place was full of ostriches, and advised him to keep a sharp lookout for ostriches, because you're likely to see one at any time. Khamis was having a wonderful time. For example, Yusuf said, 'What do the Bedouin eat? Do they eat foxes?' 'Oh, they love foxes,' said Khamis. Of course the Bedouin wouldn't touch fox with a 10-foot pole. It would be like eating a dog.*

"*We went by the southern road to Hofuf and crossed the Dahna. There were just two tracks . . . and when we came to the Dahna sands the road disappeared. So we drove along, and every once in a while we'd stop and Khamis and I would get out and climb a high dune and look around . . . and we debated as to when we should turn south, because when we turned south we . . . got into Wadi Sahba and then we went right into al-Kharj.*

"*But we were in an area that neither Khamis nor I were familiar with. So we decided we would go on further west. We cut off, and when we came to where the cliffs of the escarpment go clear down to al-Kharj . . . [we] . . . couldn't find any way to get down . . . We decided . . . to . . . head further east, and then we could cut down the escarpment. This was about sunset.*

"*[When] we started to make camp . . . Yusuf came to me. He was weeping . . . 'We're lost, we're lost, we'll all die of thirst in this trackless desert.' And I said, 'What makes you think we're lost?' He said, 'I asked Khamis. I asked him if he knew where we were and he said he didn't know.'*

"*Of course this was true, he* didn't *know where we were in a very strict sense, but not in the sense that Yusuf took it. When we got to al-Kharj, he was very grateful.*

"*Yusuf went on to Jiddah, and we unloaded. We used to carry our stuff in green-painted boxes . . . big enough to take two five-gallon kerosene cans . . . So we took a couple of these out and put them alongside the wall . . . and then we came back and I decided I'd look at the sextant. I lifted the green box up and there was this big snake. I had a .22 pistol so I shot the snake. And Khamis, hearing the shot, came back running to see what it was about. And I said, 'Well, I shot this snake.' . . . And he walked away with the snake on a stick. When he got about 20 or 25 feet away, he stopped. He said, 'I wish Yusuf were here.' I said, 'Why? What would you want Yusuf here for?' He said, 'I'd tell him I'm gonna take this away and make soup out of it.'*"

through all the ritualized Arabic greetings, 'Evenings of light', 'How is your health?', 'Praise be to God!', 'And how is your health?,' *'al-hamdu li-llah!'* Then he stopped. We sat and we sat. I said, 'Well, we're going down to the south there. As you know, we're a party of geologists and we came to pay our respects.'

He just replied quietly, *'al-hamdu li-llah.'* Then a guard down at the far end of the room hollered at the top of his voice, *'qahwa!'* They had been watching Ibn Jiluwi's lips, and he had said 'coffee' under his breath. It caught us by surprise, this man with a rifle, bandoliers and daggers, suddenly shouting out like that. Then you could hear the call for coffee going down the stairs and clear out into the recesses of the kitchen, *'qahwa! qahwa!'* Then they brought coffee. We chatted some more. Then he whispered *'qahwa!'*. We had more *qahwa* and then left.

"The development of the oil fields created a new political center in al-Hasa, Dammam. For a time the amir went back and forth between Hofuf and Dammam, but eventually he moved to Dammam. At one time I used to go every morning to Dammam to see him, to pay my respects. This was of course after I had moved to government relations from geology. We would go through the ritual, 'I'm all right; how are you? It's a nice day. Praise be to God!' Then we'd have coffee in our usual way and I'd take my leave. I'd do business next door with the secretary. 'Abd al-'Aziz Mubarak came along as interpreter. He loved the *qahwa* ritual. One time he said to me, 'Anytime Sa'ud ibn Jiluwi is in a good mood, you'll win a riyal and anytime he's in a bad mood *I'll* win a riyal.'

I said, 'Abd al-'Aziz, how in hell can you *tell* when he's in a good mood?' He said, 'If he talks about anything between the time we get there and say hello to him and the time we take our leave, besides talking about coffee, tea and the weather, he's in a good mood.' 'No way,' I said, 'no way.'

But the amir gradually changed. Eventually, he would invite me in for long chats. He was insatiably curious. One time, about 8.00 in the evening, I got a message saying he wanted to see me. I rushed to Dammam to see what the emergency was. I went right into his *majlis*. We sat there and sat there and finally I said to him, 'What was it you wanted to see me about?' 'Oh,' he said, 'I didn't want to see you about anything. I just wanted to talk.' By about 1948, he talked with me about practically everything.

*[Barger was first approached by government relations while he was stationed at the Yabrin oasis, his base camp for the Rub' al-Khali expedition. Max Steineke drove down to tell him the news, leaving the decision up to him, although he was anxious to have Barger as his second-in-command].*

Yabrin was abandoned because of malaria. The palms there were owned by the Al Murrah tribe. They came in the springtime and fertilized the dates, went away and came back in the fall to gather the harvest.

We could see these damned wigglers in the wells. We knew the fish ate them, but we didn't know how we could get fish there without great difficulty. Frogs were a different matter. There were a lot of frogs in the Qatif oasis. One time when one of our trucks was going there, we gave Salih, our cook, 10 riyals and said we wanted 100 frogs. He was to put the frogs in a box – a layer of frogs, then some wet alfalfa on top and then more frogs and more alfalfa. Salih said, 'Well no, don't do that; they'll all die. Just put them in an empty five-gallon drum and put the water in and . . .' 'Do what we tell you to do, we told him, 'Frogs do not live in water, they live on land.' To Salih's astonishment, I think all but two of the frogs survived the journey from Hofuf to Yabrin.We found out later they didn't have much effect on the mosquitoes, but they survived there. I went back several years later and there were still frogs around. It was an attempt to ameliorate the malaria.

*[Government relations brought Barger into contact with a number of key figures in the Saudi government, among them the minister of finance, Abdullah Sulaiman].*

Abdullah Sulaiman was a Najdi, from Qasim, and he was with the king from very early times. He went through all those hard years of the Depression, when the king would write chits out to people and say, 'Go to Abdullah Sulaiman and get them redeemed.' If he didn't have anything to redeem them with, he made himself scarce. He was a man of great patience. He tried to develop agriculture. He was the grinding horse on the al-Kharj agricultural project. When we had things to discuss, they were discussed in a way designed to *solve* the problem, not make it worse.

"Salah Islam was the assistant local government representative. He represented the minister of finance, who was the man charged with the responsibility for relations with the company relative to the concession. He lived in al-Hasa, but he didn't have the same jurisdiction as Sa'ud ibn Jiluwi. His was limited to the company and company affairs.

When he first came, we discovered that Salah spoke German. So Floyd Ohliger communicated with Salah by way of Bill Eltiste, who spoke German as well. The local government representative would tell Salah, his assistant, something in Arabic. Then Salah would tell Bill Eltiste in German and Bill would tell this to Floyd in English, and then it would go back again. You can imagine how many nuances got lost in this way, but as long as people were willing to go half way and try to understand each other, it worked. In fact, it worked very well. Salah was also a man of great vision. Soon after the discovery of oil, he said, 'You know, one day al-Khobar and Dammam will be the same town. There will be a great city here.'

He taught himself English. He said, 'I started reading the dictionary. But I only got to the letter "c".' I said, 'There has to be some easier way than this to learn English.' So he got some people to help him and during the war I gave him a book a month to read – paperbacks, everything from *Popular Science* to Damon Runyon's *Emerald Inn*. The result of this unorthodox education was that Salah became one of the best interpreters from English to Arabic.

I was placed in government relations presumably because I knew quite a lot of Arabic for the time. We didn't have any working hours. We worked fairly hard, but we also had leisure time. We didn't have any whistles blowing. For example, I had time to help Salah Islam plant the first palms in al-Khobar. Al-Khobar was nearly barren. We'd had an agriculturalist by the name of Hamilton, who came with the U.S. Agricultural Mission of 1942 to advise us. He suggested that we install flaps – check valves. When the tide came in, these flaps would shut so that the full salinity of the Gulf wasn't brought onto the land. Then when the tide went out, fresher water from springs came in behind. We built the traps, and they worked. I did the surveying, Salah Islam supplied the enthusiasm and we got palms growing where they'd never been before.

If a guy had to to work 24 hours to get the job done, it was expected he'd work 24 hours. On the other hand, no one would begrudge him knocking off for a gazelle hunt for a couple of days.

Everybody had close contact with the local people. This gave us time to develop a small cadre of people who knew something about the country that they might not have learned if they had been under forced draft. People like Paul Arnot, a petroleum engineer, or like Bill Palmer, who was a jack of all trades. There were enough of us to foresee problems and take action to temper them.

Bill Eltiste was remarkable. I think his education was limited to high school. But he was a born mechanic. He had a great deal of experience abroad, in South America and other places. He had great good sense and was very modest, and he had a sharp, inquisitive mind. His idea of a good weekend was to go to bed with an electrical engineer's handbook.

When it became apparent that needs were developing which we were either going to have to fill ourselves or get someone else to fill, Floyd Ohliger put Bill Eltiste in charge of a new outfit, which was to see what we could do about developing the local community. We knew it would be a good thing for them and a good thing for us.

We had very large purchasing power, if we could use it. But we couldn't use it if people didn't know how to conduct purchasing or if they didn't have a big enough market to get things which *we* could use in a fair quantity, but that the local people didn't use – such as Kleenex, for example. Bill's job was to see what he could do about developing these things. He was a man of complete probity. He was soft spoken and engaging and people trusted him and he knew his business.

He had considerable expertise in a large number of fields, mainly mechanical, and he could tell you how to run a diesel engine if you wanted power plants. He could help you drill a water well if you wanted to drill water wells. He knew a lot of things.

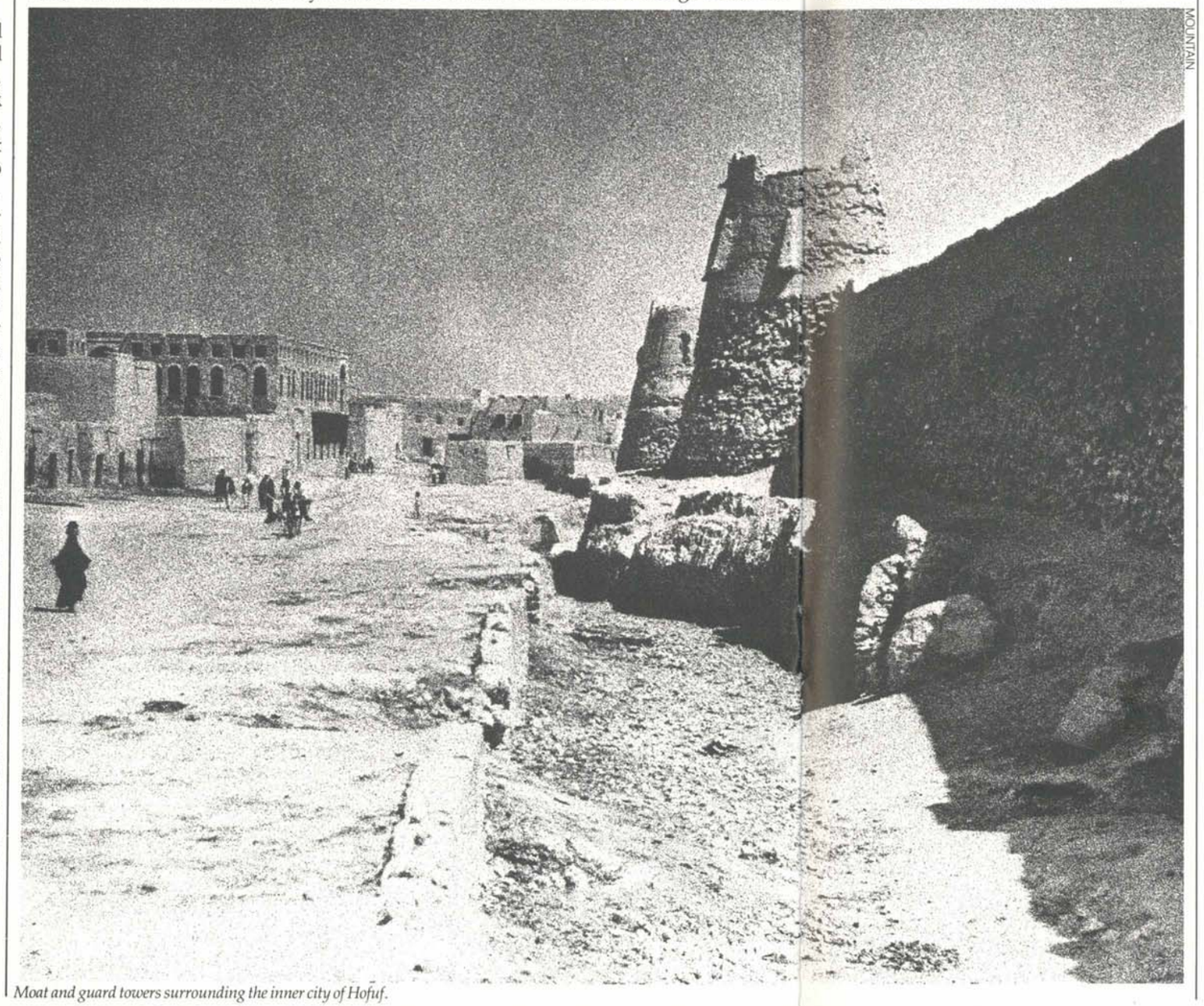
We instituted a plan whereby Saudi employees could leave the company for a year and see if they could establish themselves as entrepreneurs. If they were unsuccessful, they could come back to the company with no loss in status or benefits. If they wanted to be independent, then all to the good, because that was what both we and al-Hasa needed – to build the economy.

"Sulaiman Olayan was one of these. He started in the storehouse and eventually we got him into government relations, where he served as an interpreter. Then he started hauling pipe for the Trans-Arabian Pipeline on contract.

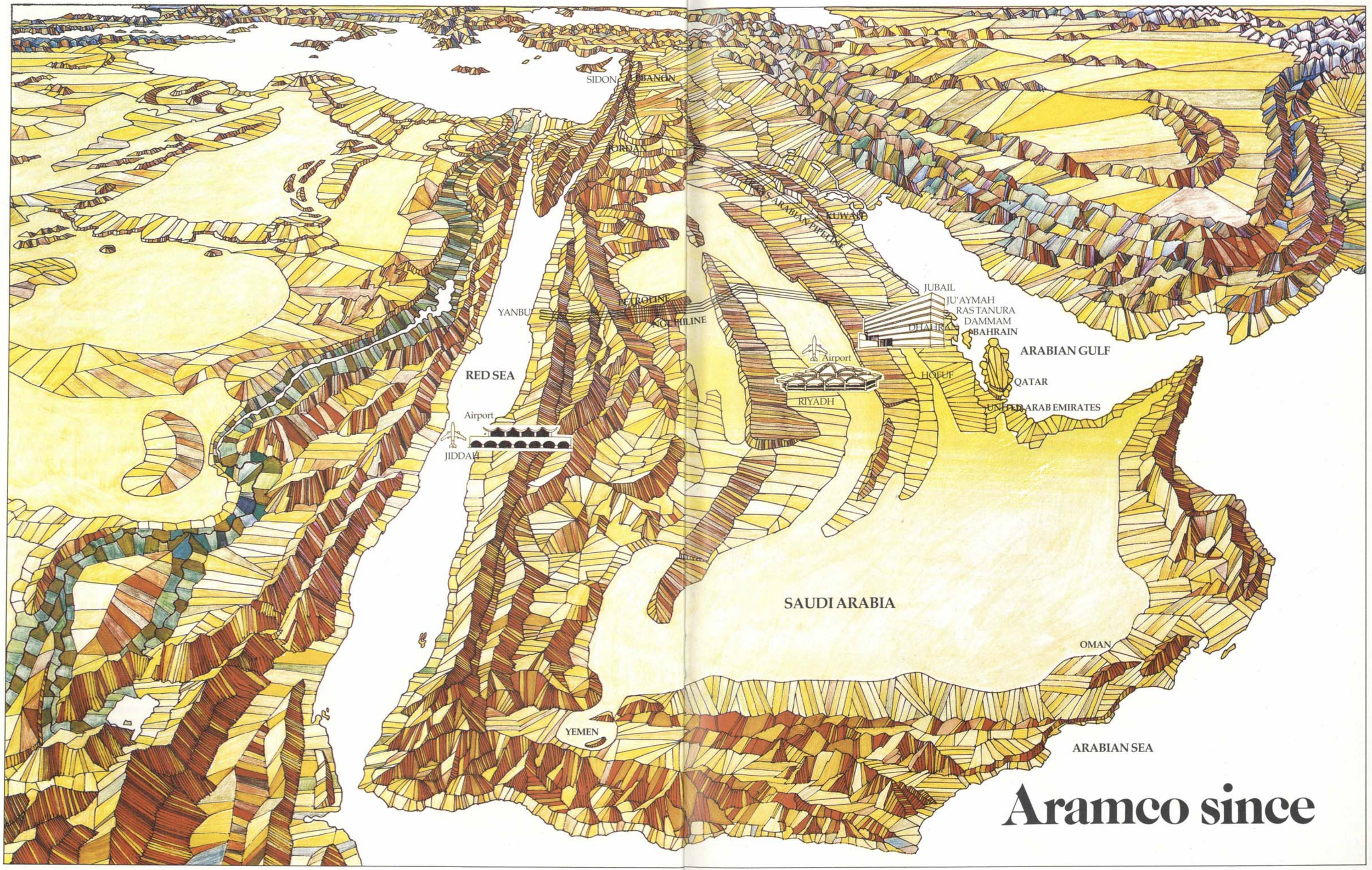
There were others too, and it took a lot of courage to do this kind of thing. There were the Hazza brothers, for instance, and 'Ali Tamimi and Bin Laden.

Bin Laden was a natural entrepreneur. He took enormous risks and got great rewards. Then of course there were a great many people who went into business simply because Aramco had decided that its business was producing oil and not running paint shops and welding shops or making nitrogen gas and oxygen gas for welding. The idea was to inject money into the local economy if at all possible.

It is an enormous satisfaction to grow up with a society which is in rapid change and to do what you can to help.




*Moat and guard towers surrounding the inner city of Hofuf.*




# Aramco since

# A Kingdom and a Company

WRITTEN BY WILLIAM E. MULLIGAN

"Almost everybody who writes anything on the history of Aramco seems to think that the 'frontier days' were the only exciting times in the company's history. Not me. I think those first chapters, colorful though they now seem, were just a prelude to the *real* story: how the sons and grandsons of a tribal society in a distant land came to manage what is the largest oil producing company in history. As the story of the 30's is largely an American story, so the story of the 80's is an Arab story.

But that came later, and I certainly didn't expect anything like it when, in 1946, I left Aden, got discharged from the U.S. Army Air Force and made my way to the new oil community called Dhahran to join Aramco; at that time, like everybody else, I was immediately captivated by the Twitchell-to-Hoover-to Steineke legends. More to the point, I was also swept up in the heady boom town excitement of the first post-war expansion programs. That's my first memory of Aramco: the excitement.

*Saudi Arab trainees, above, and Aramco's Exploration and Petroleum Engineering Center, below.*

At that time, at the end of Aramco's first 13 years, the company was producing 58,000 barrels of oil a day. That was a trickle compared to later production – it would take another 13 years to reach the million-barrel-a-day level recorded in 1958 – but already, you could see, Aramco was getting ready for the big time. In Aramco's 1946 Report of Operations, for example, the company said that it had nearly tripled the average daily production of the previous year. It also said that its new refinery, designed to process 50,000 bpd, was handling 100,000.

That refinery, which replaced the frontier period's 3,000 bpd 'teakettle,' had been started while World War II was still in progress – partly because in 1943 the U.S. government realized how important Saudi Arabian oil could be in the planned invasion of Japan. And its formal opening on September 19, 1945 – 17 days after the terms of surrender were signed in Tokyo Bay – brought to a close an extraordinary burst of war-time activity that had built the refinery, a new oil pier and a submarine pipeline to Bahrain that for a very short time was the longest submarine pipeline in the world.

The opening of the refinery also sparked another visit by King 'Abd al-'Aziz; though he didn't actually come until 1947, he came specifically to see the refinery. And when he did, he underlined the changes that had already taken place in Saudi Arabia since his first visit in May, 1939. Then, he and a retinue of 2,000 had driven 320 miles (520 kilometers) from Riyadh in a great caravan totaling 500 automobiles. Now, in January 1947, the aging king and his entourage arrived in a fleet of six airplanes.

"In some ways, though, the king was just the same and to many who had been there for the first great visit, there were similarities. One was a tent city erected on the site of today's University of Petroleum and Minerals; though he had been expected to stay at a new guest house – completed just in time – the king announced that he was moving to the tents, where, evidently, he felt less confined, closer to his friends and more available to his subjects. As before, the king toured Aramco installations in Dhahran and in Ras Tanura, and once again played host to an amir of Bahrain, now Shaikh Salman bin Hamad Al Khalifa, who had assumed power in 1942 when his father died. To mark the occasion the amir brought as presents 14 mares, two stallions and 32 riding camels.

During the five-day visit, the king also gave and attended banquets. For one, Amir Sa'ud ibn Jiluwi, governor of al-Hasa, bought practically all available silverware and china in the eastern region and Bahrain. For another, when the king entertained the ruler of Bahrain, the menu included 925 chickens and 320 sheep. In magnificent displays, the meals were served under six large tents erected end-to-end, with bolts of white broadcloth unrolled to provide one long tablecloth, 10 feet wide and 225 feet long.

One of the most agreeable events on the program was the audience King 'Abd al-'Aziz granted the women and children of the Aramco community. The king met and


NEW YORK Herald Tribune

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talked through an interpreter with each of the women, several of whom brought along babes in arms. It was a photographer's dream and in a precedent-shattering event David Douglas Duncan, then of *Life*, obtained a dramatic picture over the king's shoulder of the king chuckling over the antics of the children assembled before him where they were served cookies and juice. At the same time, he was interviewed by Clifton Daniel of *The New York Times* – another indication of development in the kingdom, and the world's attitude toward it.

Meanwhile, important changes in the company's corporate structure had occurred. Much earlier, in 1937, Socal (the Standard Oil Company of California), needing market outlets for Saudi oil, had transferred an interest in Aramco to the Texas Company (later Texaco). Now, in late 1946, after seeing that development of Saudi Arabian petroleum reserves called for enormous capital investment, the partners arranged for the Standard Oil Company of New Jersey (now Exxon and called 'Jersey' by us), and the Socony-Vacuum Oil Company (now Mobil) to join Socal and Texaco as owners of Aramco. The arrangements, in fact, were not completed until 1948. But from then until January, 1973, when the Saudi Arabian Government acquired a 25% interest in Aramco – later increased to 60% and in 1980 to 100% – the shareholdings in Aramco were: Standard Oil of California 30%, Texaco 30%, Exxon 30% and Mobil 10%. Between 1975 and 1979 Mobil increased its stockholding to 15%, with other companies' interests correspondingly reduced.

For Socal and Texaco, the 1948 changes meant extensive new marketing outlets, particularly in Europe. It also provided the capital for what would become the largest project ever tackled by private enterprise: construction of an overland pipeline to carry crude oil from Saudi Arabia to the Mediterranean.

By then it was pretty clear that the post-war world was going to need a lot of oil – and that we had it. But it was also clear that getting it to Europe or wherever wasn't going to be all that easy. In those days, after all, we didn't have those huge 200,000-to 500,000-barrel supertankers that we have now. Tankers then were still measured by the war's T-2 tankers, which were only 16,600 deadweight tons and had a top speed of about 14.5 knots. In those days, as Tom Barger wrote one time, supertankers weighed in at 28,000 dwt.

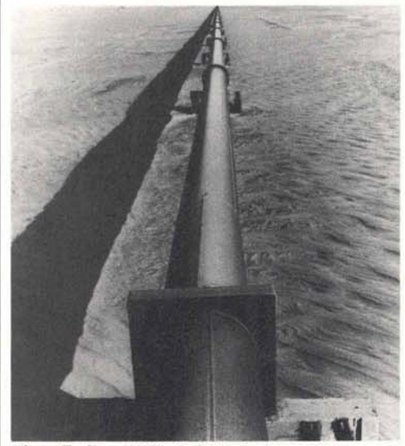
As a result, moving oil from Saudi Arabia to Europe involved a nine-day, 3,600-mile voyage (5,790 kilometers) from the Arabian Gulf down through the Strait of Hormuz, out into the Gulf of Oman, out across the Arabian Sea and the Gulf of Aden, up the Red Sea and through the Suez Canal to the Mediterranean Sea. It was a long voyage and an expensive one: Suez Canal tolls alone took close to $40,000. So naturally, Socal and its new partners began to look around and see if there were a cheaper way of moving the oil and decided to build the Trans-Arabian Pipeline (Tapline) – what *Aramco World* in 1964 called the long steel shortcut – across northern Saudi Arabia, Syria, Jordan and Lebanon.

"Tapline, a 30-31 inch pipeline, may not compare with today's mammoth 48-inch east-west line – from the Eastern Province to Yanbu', but even now, when you've got crude-oil and gas pipelines criss-crossing areas like Siberia and Alaska, the construction of the Trans-Arabian Pipeline still strikes me as a monumental achievement. When it was completed in 1950, Tapline was the longest pipeline ever built, as well as the biggest project ever financed and built by private industry. After the story of the discovery well, in fact, I think, it's the most exciting story to come out of that period.

At the planning stage, the problems confronting Tapline's engineers must have seemed enormous: a route close to 1,060 miles (1,700 kilometers) of sand desert, pebbled plain and rocky plateau, two mountain ranges, temperatures that went from 10 degrees Farenheit to 121 degrees and, along vast stretches of the route, an almost total absence of water, roads, ports or people. And to build it, some 550,000 tons of pipe equipment and materials would have to be shipped halfway around the world, then trucked into the hinterland.

Then of course, the war in 1948 intervened, when the State of Israel was set up in Palestine, and that changed everything. Because of pre-war tensions, the start of construction at the northern end had already been delayed, and when war broke out the site of the pipeline's terminal was shifted from Haifa – in Palestine – to Sidon in the southern part of Lebanon. This, ironically, is the place that was invaded and occupied by Israeli troops in the early 1980's just as the Tapline operations were being phased out.

By 1949, however, work started and on Sept. 2, 1950, the two ends were welded together. Three months later, to the day, Tapline opened the valves in its undersea loading hoses in Sidon and began to ship oil to Europe and beyond. The Tapline shortcut provided a valuable outlet for Saudi Arabia's petroleum – as well as a training ground for such executives as Bill Chandler, who came from Alaska and later became Tapline's president. Another such executive is John Kelberer, a communications engineer in Tapline's early days but now Aramco chairman of the board.



*Above: Tapline – 1950's. Left: Pipelaying – 1960's.*

Like most Tapliners, Kelberer has rich memories of life on the line. 'It was a real pioneering effort,' he said, 'little to work with and much to accomplish. It was great to be able to work with the total aspects of all the projects – from design through implementation and operation.'

As happened in Dhahran, Kelberer went on, Tapline construction had an instant impact on Saudi Arabia. 'The Saudi contingent working with us were mostly young men from Bedouin tribes, since there was no real settled population in the area. It was marvelous to see these men learn and develop...'

# Shalfan: "We have gone from nothing to everything"

INTERVIEWED BY MARY NORTON

*"Aramco is a family," said 'Abd al-'Aziz Shalfan last year in an interview, "a big family now, but still a family and I am one of its members."*

*Shalfan – who died shortly after giving that interview, on the eve of Aramco's 50th Anniversary celebration – was not just one of its members; he was its oldest member. Back when he joined the company – as a boy – there were no badges; that came when the work force increased. But when badges were introduced, Shalfan, among the first handful of Aramco employees, was given Badge No. 4, and when he died, nearly half a century later, the diminutive pioneer-employee had the longest service record.*

*He had long since been eligible for retirement, of course, but that was a subject he preferred to avoid. He would much rather talk about the early days when he worked with the men who are now part of the legend: "Bert" Miller, "Krug" Henry, Dick Kerr, Russ Gerow, Hugh Burchfiel, Floyd Ohliger and the person who, in his memories, looms largest of all: Max Steineke, the man whose work explained Saudi Arabia's geology, and who, affable and egalitarian, had a tremendous personal impact on all his associates.*

*For a Saudi from the Najd, now the kingdom's Central Province, Shalfan's background was unusual. Most Najdis had never seen a foreigner, let alone a foreign land, but Shalfan had been taken, at age nine, by his merchant uncles to Kuwait – a 14-day journey by camel caravan. There, to supplement Shalfan's proficiency in Koranic studies, his uncles had enrolled him in a regular school. Later, he had moved on to Bahrain and found work with a small shopkeeper in the main* suq *at Manama on the coast.*

*While so occupied, one steamy morning in the spring of 1934, he spied among the throngs, two westerners in Arab garb. His curiosity piqued, Shalfan sidled up to their interpreter for a briefing. "They are geologists," he was informed, "looking for 'kerosene' on the mainland."*

*In 1932, two years before, oil had been discovered on Bahrain and the relative prosperity of those who had gotten jobs in the industry was not lost on young Shalfan. So, in one of those moments when life changes because of a chance remark, Shalfan went up to the two geologists, Hugh Burchfiel and Max Christopher. "I told them that I was a native of Saudi Arabia and asked if I could go along with them. They hired me on the spot."*

*Dashing home, Shalfan stuffed his* thawbs, ghutras *and* 'agals *in a sack and rushed down to the shore, picking his way through the maze of pearling and fishing* dhows *in an anxious search for the oil company's motor launch. By nightfall, he was the new camp assistant in the rudimentary headquarters at Jubail. For a boy just turned 12, it had been quite a day.*

*By then, the Casoc geologists were moving inland in pairs, methodically studying and mapping the terrain in an effort to determine what lay beneath the sedimentary formations, and during the 1934-1935 season, Shalfan went along, sharing the hardships and frustrations – wind and sun, flies, hard work and isolation – but also the friendships. "At first, we were apprehensive," Shalfan admitted. "We did not know what to make of these foreigners or how they would treat us. But we found these men to be excellent. All of them spoke some Arabic and tried to learn more. In the evenings we would sit together over coffee and speak. We developed a genuine respect."*

*Shalfan also shared in the excitement when – perhaps in response to Steineke's urgings to the drillers to "dig a little bit more, dig a little bit more!" – the well called Dammam No. 7 hit paydirt on March 3, 1938, and when King 'Abd al-'Aziz Al Sa'ud, came to open the valve that would allow the first crude oil to flow aboard the first tanker – before a crowd of some 2,000 people. "The king was happy at the discovery of oil," recalled Shalfan.*

*It is not easy to describe the scale and depth of the transformation that the discovery of oil has brought to Saudi Arabia in the 50 years since, but last year, Shalfan put it as well as anyone: "We have gone from nothing to everything."*

*Like most Saudis – and expatriates – Shalfan, by last year, was often bewildered by the overwhelming change in Aramco – as the ranks swelled from a handful of men to a roster in excess of 57,000, and a small mining camp mushroomed into a city. But right to the end his tie was still personal – one reason perhaps for his deferral of retirement. One always hates to leave his family.*

This was true up and down the line. In less than 20 years, 75 percent of Tapline's jobs were filled by Saudi Arabs – almost all the offspring of nomads – and as early as 1964 two of the three shifts on all five pumpstations were manned exclusively by Arabs. This was equally true of divers out there in the harbor, and in downtown Beirut, where a staff of dispatchers controlled the daily flow of oil into what eventually would be a 4,600,000 barrel tank farm in Sidon.

In Saudi Arabia, in the meantime, and long before Tapline was completed, Aramco had also assumed responsibility for still another massive project: the construction of a 360-mile-long railroad (580 kilometers) between Dammam on the Arabian Gulf and the capital city of Riyadh deep in the interior. Even for a company getting used to thinking big, this was stretching its capacity a bit – since the first part of the project included construction of a deep water port with a two-berth wharf connected to the mainland by a seven-mile-long causeway and trestle (11 kilometers). Enlarged over the years by the Saudi Arabian government, this port, by 1980, had berthing facilities for 40 ships.

Aramco did not actually build the railroad and port. It contracted the job to a consortium of firms headed up by a major United States firm which had also played a major role in the construction of the Ras Tanura refinery, and was even then working on the Trans-Arabian Pipeline. Starting in 1947 the railroad slowly pushed its way from Dammam to Dhahran, Abqaiq, Hofuf, and al-Kharj, until, in October 1951, King 'Abd al-'Aziz and Crown Prince Sa'ud, at traditional ceremonies, drove a golden spike into the last tie and a new diesel locomotive pulled into the Riyadh station to inaugurate the new service.

In the late 1940's, Aramco also had to face up to the fact that many of the countries wanting to buy oil had neither dollars nor other convertible currencies to pay for it. Many countries, moreover, were committed to buy so-called ' sterling oil ' produced by British companies, so Aramco, to compete, worked out arrangements to sell oil for the so-called ' soft ' non-dollar currencies.

But the company also had to find ways to *use* those currencies to buy supplies and services. Its most important step in this regard was the formation, in November 1948, of a subsidiary company called the Aramco Overseas Purchasing Company, later called the Aramco Overseas Company (AOC). Initially headquartered in Rome, AOC was moved to The Hague in The Netherlands in 1954. For years after, AOC also maintained international purchasing offices in London, Sydney, Cairo, Rome, Tokyo and Beirut, but by April 1984 all but the Tokyo office were closed.

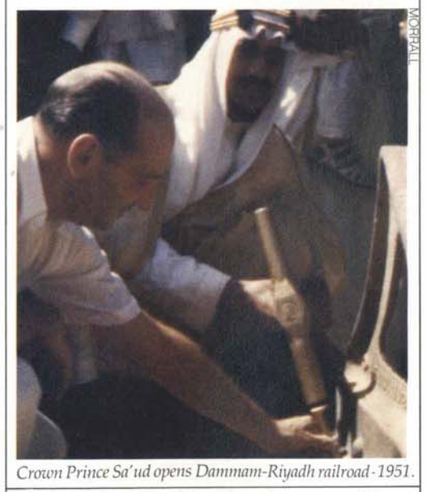
In the late 1940's, Aramco was also expanding the search for oil. There had been times during World War II when exploration had slowed to a crawl. But now, the war over, Aramco went quickly back to fundamentals. In June 1948, we discovered the 'Ain Dar field and in 1949 the Haradh field – over 100 miles to the south. Although it was clear to the geologists that both fields fell within a single geological feature, it was not until 1956 that Aramco was convinced that they and several other adjacent fields were really all one: Ghawar, the world's largest field ever, 160 miles long and 25 miles wide (256 by 40 kilometers). Almost simultaneously, a wildcat brought in the Safaniya field, the world's largest offshore field. Clearly, Saudi Arabia was going to be in the oil business for a long time.

Changes were taking place in Aramco's executive suite as well. One was the arrival and departure of James MacPherson, easily the most colorful oilman in the Middle East. A Scot, and a veteran of the First World War, MacPherson came to Saudi Arabia in July 1944 after stints with Socal and the War Production Board in Washington D.C. MacPherson, who was vice-president and chief officer in residence of Aramco, strove for effect and got it. He kept a cigar at the ready as constantly as Winston Churchill. He signed his name with a theatrical flourish. And when attacked he defended himself. One man, for instance, learning that MacPherson was being put in charge of Aramco's Saudi Arabian operations, got annoyed. 'What does he know about the desert?' he asked – and got a quick answer. 'You tell that guy,' MacPherson snorted back, 'that I . . . walked all the way from the Suez Canal to Jerusalem. And I carried a pack and a gun.'

Up to then, Aramco's headquarters were still in New York. W. F. ' Bill ' Moore, president from 1947 to 1951, maintained a Dhahran residence briefly, but it was not until 1951 that F. A. ' Fred ' Davies, chairman of the board and chief executive officer, and R. L. ' Bob ' Keyes, president, officially moved to Dhahran. As executives go, these two men made a good team. Fred Davies, bright and hard working, had been one of the geologists who recommended that Socal drill for oil on Bahrain and attempt to obtain a concession for Saudi Arabia. A great ' detail man, ' he read a copy of practically every letter and report produced in the company. Not surprisingly, he got on well with Keyes; a big, but gentle man, Keyes refused to compete for power and executed his duties with quiet competence.

From the start, Aramco's executives were a varied lot, each making a different kind of contribution. Davies' executive assistant and eventual successor was Norman 'Cy' Hardy, a 'clean desk operator,' who refused to read almost anything longer than one page and who helped bring Aramco into the corporate big leagues. Shortly after his arrival, he strengthened Aramco's budgetary controls, and in 1953, as a vice-president, established the Aramco Management Committee, told company executives to let their subordinates run their organizations, and said, in effect, 'let us think, plan, and coordinate . . .' A man who did not suffer fools gladly, Hardy poked his ever-present pipe at holes in arguments, cheered on those who aimed high and hit their targets, and admonished and taunted the foolish and faint of heart.

Hardy, who had worked for Socal in what was then the Dutch East Indies and had learned Malay, was determined to learn Arabic. He had a talent for languages and he took his lessons seriously – with the result that long before his retirement in 1960 he had initiated the practice of addressing Aramco employees over the company's television station – in Arabic.



MORHALL

*Crown Prince Sa'ud opens Dammam-Riyadh railroad - 1951.*

One of Hardy's favorites was Tom Barger. No sooner was Barger made manager of government relations – he never did go back to either geology or mining – than Hardy spirited him away to work on a variety of special assignments. One was the company's ' New Home Ownership Plan.'

Earlier, Barger had been on a committee which visited oil companies in Iran and Venezuela to study various approaches to employee housing. From this developed a plan – instituted in 1951 – under which employees could acquire ownership of land made available by the government and developed by the company, then get a long-term subsidized loan to pay for construction of houses.

Indeed, the Home Ownership program is one of Aramco's outstanding social achievements.

Home Ownership came at an important time in Aramco's history. In 1950, the Korean War had started, and in 1951 Iran had canceled the Anglo-Iranian Oil Company's concession and nationalized its oil industry. Together, those events exerted increased pressure on Aramco to produce more oil and that in turn meant more people. Aramco's work force swelled to more than 24,000 in 1952 – a total never reached again until 1977, 25 years later.

Inevitably, growth like that creates problems. It had in 1944 and it would again when the expansion of the 1970's was getting underway. In the early 1950's, however, there was a difference that Aramco didn't immediately appreciate. In the 40's, the work force was a mix of some 600 American roughnecks, 1,300 Italian colonists and soldiers from Eritrea, and other itinerant internationals. But the 1950's expansion involved Saudi Arabs and that wasn't at all the same. When you're housing and feeding roughnecks you can make do with bunkhouses and chow lines; roughnecks, usually transients, prefer it that way. But a Saudi work force needed permanent housing for families, plus medical care, schooling and buses. In addition, there was inflation – which always goes hand in hand with sudden growth – and the fact that new currents of thought, not always friendly toward either the country or the company, were sweeping through the Middle East.

In the summer of 1953, as a result, workers petitioned for cost of living adjustments, better housing, additional transportation facilities, and schools. In response, a concerned government appointed a high-level committee to investigate the problems.

Actually, the Saudi employees had solid grounds for their petition. Though you might justify giving precedence to refineries and pipelines over housing and schooling in the 1940's, you couldn't justify it in the 1950's – as the company tacitly acknowledged by adopting certain new policies and making some very real improvements. Home Ownership helped, of course, but the company also increased the pay rates of all Saudi employees by 12 to 20 percent, shortened the work week to 40 hours and agreed to construct schools for

workers' children. About then, too, on November 9, 1953, King 'Abd al-'Aziz died and Crown Prince Sa'ud became king. Since he was aware of the workers' concerns, King Sa'ud visited Aramco installations himself and, as a result, established a new system of government labor offices

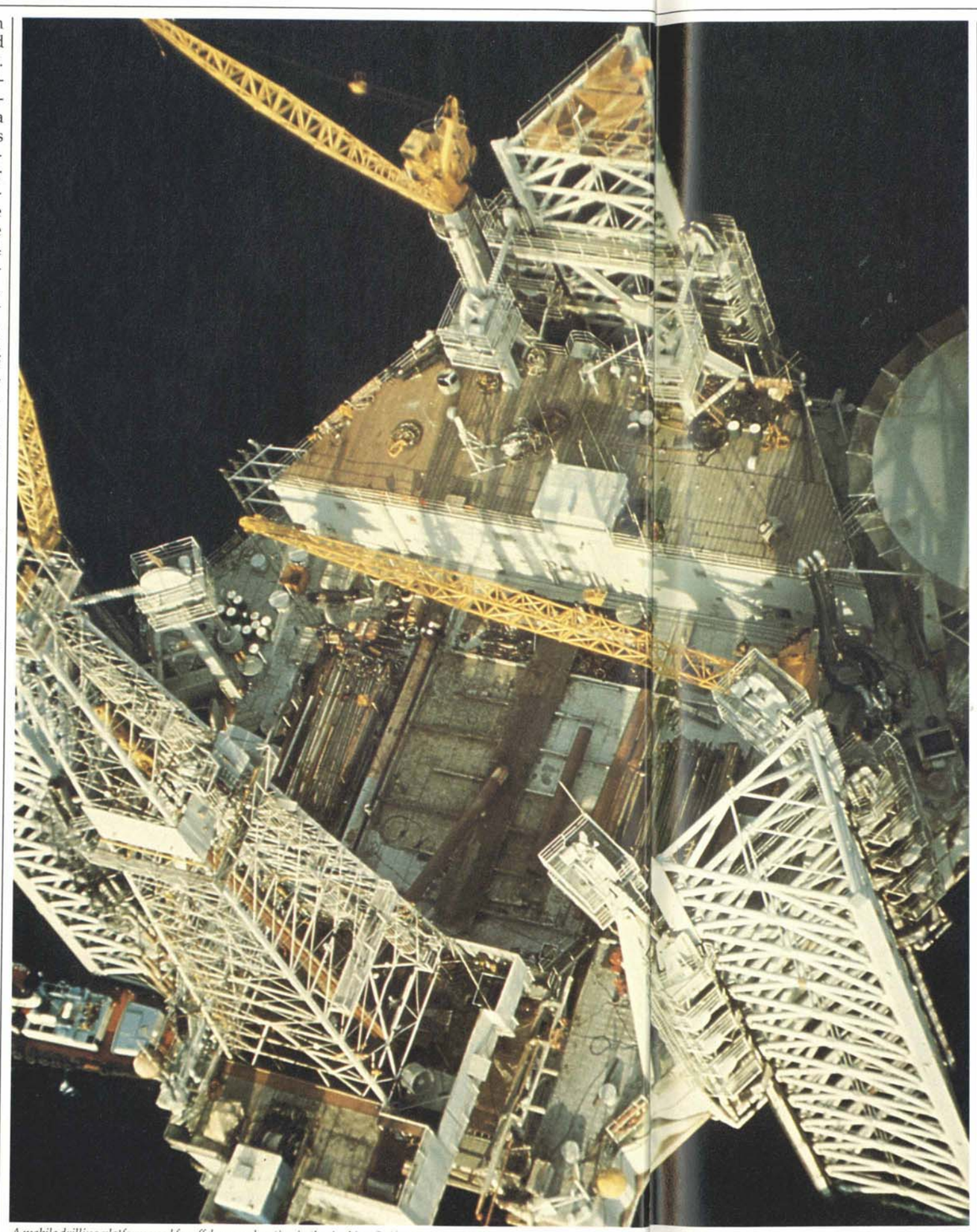
One indication of the Saudi Government's desire to increase its control over Aramco in matters touching on the kingdom's national interests, in particular the pace of Saudi development and resource conservation, was its appointment in 1954 of Abdullah Tariki director general of petroleum and mineral resources and, in 1960, minister of petroleum and mineral resources. From 1944 through 1954, Tariki, schooled in petroleum geology, had headed the Dammam inspection office of Saudi Arabia's Bureau of Mines, and later became one of the founders of the Organization of Petroleum Exporting Countries (OPEC). In October, 1959, with Hafiz Wahba, he also became one of the first two Saudis elected to Aramco's Board of Directors.

During this period, the government began to place great stress on training programs for Saudis in the petroleum industry and started to seek a larger share of oil revenues for the kingdom. It also pushed for ways to fully use the associated gas produced with crude oil – a goal realized when the government's Master Gas System was launched in the 1970's.

"Though most accounts tend to overlook it, the Saudi presence in the Aramco story was vital from the start. King 'Abd al-'Aziz, after all, launched the whole process entirely on his own and Abdullah Sulaiman, his advisor-treasurer-oil minister, extracted a quite acceptable concession agreement from an international oil expert.

Even as early as the 1950's the Saudi presence was unmistakable. In 1957, to give just one example, Saudi Arabs made up 70 per cent of Aramco's 18,325 employees, and by 1967 held 57 percent of the company's 1,373 management or supervisory positions.

This was no accident. Almost from the day they arrived, Socal geologists and drillers had began to share their skills on a person-to-person basis with any Saudi who was interested – and most were. In addition, though, Aramco decided to implement on-the-job training with formal schooling. As early as May 11, 1940, the company established a school for Saudi Arab adults in al-Khobar in a rented house furnished with odds and ends. It started with only 19 pupils, but grew so fast that a second had to be opened within two months. Then, in 1941, discovering that



*A mobile drilling platform used for offshore exploration in the Arabian Gulf – 1960's.*

employees such as telephone operators and office boys couldn't attend school because of their schedules, the company opened still another school – the so-called 'Jabal School' – and by 1941 there was a total of some 300 pupils enrolled in the schools.

This, wrote Wallace Stegner in *Discovery*, was 'the germ of something momentous' – the first stage of an extraordinary program of training, education and scholarships – an opinion enthusiastically endorsed recently by Abdullah S. al-Saif, vice president of Southern Area Manufacturing. Years later, he said, Aramco called in consultants to see how the Industrial Training Program could be improved. They said, 'Nothing, you've got the best.'

In 1946, the Jabal School officially became 'The Arab Preparatory School,' but everyone continued to call it the Jabal School until it was, in effect, absorbed into the Industrial Training Center of Dhahran. In 1948 enrollment was cut from 174 boys to 68 when the government ordered that all boys under 15 years of age be dismissed, but they were soon readmitted when they turned up with documents attesting to the fact that they were 15 – a remarkable growth spurt, though perhaps not too surprising in adolescent boys who wanted to learn.

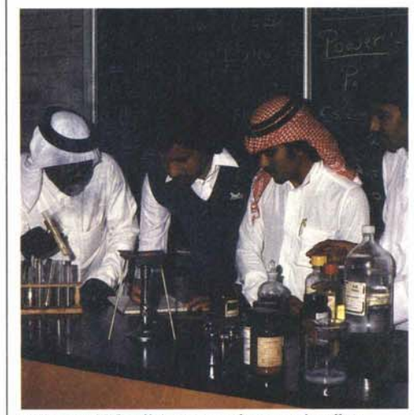
Among the early teachers – often foreigners – was a Saudi Arab named Abdul Hafiz Nawwab. A chemist, and the first Saudi college graduate to join Aramco, Nawwab taught several pupils who, today, are company executives. Ali Naimi, now president of the company received his first formal education at this school.

By the 1950's, these initial efforts had blossomed, as increased production made rapid training imperative. To speed up on-the-job training, Aramco adapted an American war-time measure for training industrial workers: it set aside one eighth of all production time for training – with phenomenal results. The company not only achieved production targets, but developed a Saudi Arab work force numbering more than 13,000 capable employees.

Later, when it became evident that higher level technical and management skills were required, Aramco centralized most of its employee training in three Industrial Training Centers and three Industrial Training Shops – although Aramco programs went far beyond vocational improvement. The Industrial Training Shops did provide skills – how to read blueprints, wire a house, fix a faucet and run a lathe – but the Industrial Training Centers supplemented that training with arithmetic, algebra, history, language training and general science.

To enable workers to benefit more fully, class hours were pretty flexible. Workers could take two hours out of their working day, attend class in the evening, or, if they were really on the ball, go full time. There was another prize too: if they were really good they could go on to advanced training abroad.

We could see the effects almost immediately. Between 1953 and 1963 the number of skilled Saudi workers shot up from nine percent to 57 percent and by 1969 there were 1,300 Saudi employees in the company's three Industrial Training Centers, 346 of them in Management Training. In addition, Aramco had picked and sent abroad for advanced training 209 other employees of whom 58 were in universities. And by 1977, those figures had increased even more.



*Today, 1,400 Saudi Aramco employees are in college.*

By then, some 500 Saudi Arabs held supervisory positions, 833 Saudi Arab employees were taking management training, in three Management Training Centers, there were 5,799 others enrolled in the company's Industrial Training Centers and shops, and 12,818 enrolled in one of the 47 on-the-job training programs. In addition, Aramco was sponsoring three employees who were working for their master's degrees in the United States and 364 others who were studying in Saudi Arabia and abroad, including 159 in U.S. colleges and institutions. Now, of course, the figures are still higher: some 1,400 Saudi employees are in college either in Saudi Arabia or abroad.

Some Saudi employees about this time began to peel off – talented, ambitious employees who either persuaded the company or were persuaded by the company to go into business for themselves. For Aramco, for Saudi Arabia and for the entire Middle East, the results were remarkable.

The reason for this development was summed up in 1957 – in part by me, as it

# Husseini: "We are a world-class producer...we have to have world class people..."

INTERVIEWED BY JOHN LAWTON

*"We can't have the bottom of the barrel, we need the top," said Sadad I. Husseini, general manager of Petroleum Engineering, and a man obviously not from the bottom of the barrel himself. Brought up in Riyadh, and schooled abroad, Husseini holds a B.S. in geology from the American University of Beirut, and an M.S. and Ph.D. in geology from Brown University in Rhode Island.*

*"By the time I graduated [in 1972], Aramco had just got into big drilling requirements. I just showed up [in Dhahran] and was sent out immediately to a wildcat rig," Husseini went on, adding that as a geologist with the Exploration Department he then spent two years in the Empty Quarter and another year elsewhere – including an offshore assignment – before becoming a supervisor in 1976 and assistant chief geologist a year later.*

*Husseini then completed a number of superintendent-level development assignments in Operations and Maintenance prior to being named director, Budgets and Programs, Corporate Planning, in 1978. Following a developmental assignment in Petroleum Engineering early in 1980, Husseini was named relief chief petroleum engineer in April 1980, and manager, Petroleum Engineering, in October 1980.*

*Today, Husseini says, his first interest is preparing a new generation of Saudi engineers to run Aramco in the future. "Saudi government education is expanding and people of higher potential are coming along more often. About 30 to 40 percent of our new engineers come from UPM [the University of Petroleum and Minerals], but most come from our own 'fast track' program. A young man with a superior secondary school record may be sent out of kingdom after successfully completing a year-long college preparatory program. He completes his degree in four years. Then, during their first three years of work, we place them in a program which provides assignments within and outside their departments so they can decide what they want to do. At the same time this gives us an opportunity to judge them."*

*But Aramco, he warns, no longer can be sure of hanging on to such people. Once the sole industrial employer in the kingdom, Aramco today must compete with other industries for employees. "Today's generation does not need the company. Their affiliations and priorities are different: they look for schooling for their children, housing opportunities and medical benefits....*

*"On the other hand, the oil industry is still the backbone of the Saudi economy, and we can't afford to have second or third rate people running it, and have first rate people going to the private sector. Our operations are becoming far more complex. We need better-educated people...."*

*Today, Husseini goes on, "we have 25 per cent of world oil reserves, we are a world-class producer and the whole world depends on us. Therefore we have to have world-class people.*

*"People talk about oil running out in Saudi Arabia, but even if we do nothing else but enhance our average recovery factor by 10 percent, we would add 17 billion barrels to our reserves of 165 billion. We have 50 fields – each with an average of three reservoirs. We have always been very cautious: carrying out lots of studies, maintaining pressure by injection from the very start, spacing our wells so we don't over-deplete one reservoir.*

*"Since...1976, we have made major changes in production policies. We have spread production out more, developed it evenly; this gives you time and time gives you new technology. More wells give a potential to come up fast [if demand increases]. We are cautious in drilling to protect aquifers [natural underground reservoirs] [and the] Master Gas System [to collect gas previously flared] was designed, built and is operated by Aramco on behalf of the Saudi Arab Government.*

*"Aramco," Husseini goes on, "certainly brought the 20th century to this part of the world ...It provided [employment] opportunities when pearling went down the tube after World War I...but...people are beginning to perceive Aramco in a different way. They no longer perceive us as a foreign company.*

*"We have to be good citizens here in Saudi Arabia and good citizens worldwide. Our behavior affects the local community as well as the international community."*

happened – in a booklet entitled *Aramco's role in the Development of the Eastern Province:*

> ...not many years ago...every expatriate Aramco employee had to send his own wash to company laundry facilities and have his shoes repaired by a company cobbler. All the food he ate was imported and warehoused by Aramco. Fresh vegetables...were flown in...on company planes. Individual banking...had to be transacted in a company cash office. Saudi Arab employees traveled ...in Aramco buses ... a company publication ... was turned out in the company print shop. Almost all cars...were company owned and maintained...

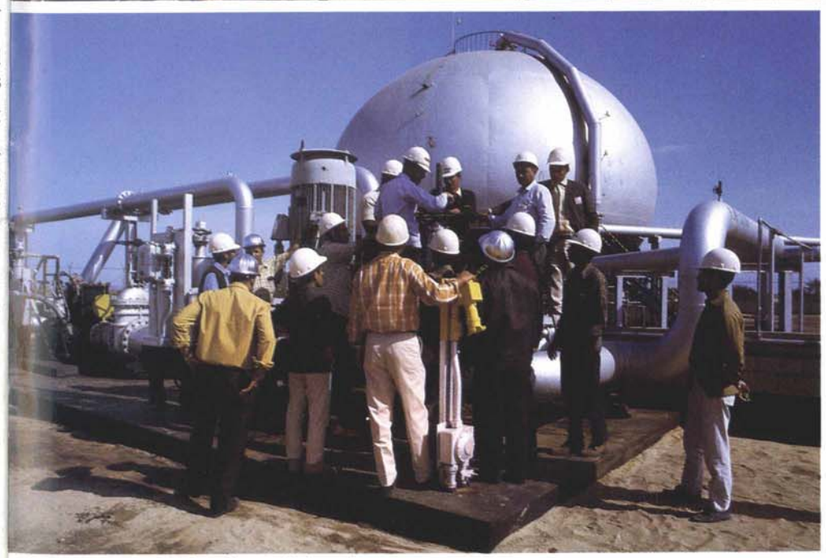
Today, by contrast, there's virtually nothing expatriate employees can't buy from local businesses, and very few items or services, that Aramco can't get or arrange from a Saudi supplier or contractor thanks, to an extent, to another Aramco program called today, 'LIDD' – Local Industrial Development Department. LIDD's functions were broader than the name implies. It was responsible for encouraging local industry and for the Community Development and Home Ownership programs. Its Agricultural Assistance Division later grew into a department, complementing the Ministry of Agriculture and Water's efforts by working with local farmers.

"Since the mid-1970's, LIDD'S assistance has focused on collecting business and economic information on Saudi contractors and manufacturers and disseminating it to company organizations to encourage local business.

'Over the years Aramco has encouraged the Saudi manufacturing sector through its policy of purchasing locally manufactured items which meet international standards,' explained Ismail I. Nawwab, general manager, Public Affairs. 'To ensure that this policy is implemented on a sound basis Aramco assists these manufacturers by qualifying and listing their products in a comprehensive catalog detailing technical information. Also, primarily for its own use, Aramco publishes other directories of local manufacturers and contractors.'

'The Aramco directories,' Nawwab added, 'are a basic ingredient in industrialization and are perhaps the first of their kind in the kingdom. The technical catalog is similar in intent to Sweet's Product Catalog and is thus very useful to non-Aramco designers and engineers requiring ready access to this valuable information.'

As a result of this policy, Saudi manufacturers and vendors supplied 82 percent of the more than $1.08 billion worth of materials purchased by Aramco in 1983.



*On-the-job-training has always been a priority at Aramco.*

NEW YORK Herald Tribune European Edition

**KENNEDY ASSASSINATED**

**Is Shot Down in Car by a Hidden Sniper As He Rides Through Downtown Dallas; Johnson Quickly Sworn In as President**

*Shocked World Mourns Leader*

*Gov. Connally Wounded*

Family Informed Of News

2 Officers Also Killed; Arrest Made

Johnson: Apostle of New Frontier

Commodity, Stock Marts Are Closed

In a sense, all this was an outgrowth of the independent Saudi Arab 'contractors,' who, years before, hauled goods on camels, and gathered rock from the Gulf. But even in the 1960's, it had gone far beyond that. By then, Saudi Arab contractors were constructing company pipelines, storage tanks, buildings and a whole range of complex oil operations facilities. Others provided bus transportation, car rentals, marine inspection, ferrying, engineering consulting, surveying and material hauling, food preparation and catering, painting and refuse collections.

Some of the contractors helped by Aramco went on to scale regional, national and even international heights, in what I personally have been calling the 'alumni program,' since Sulaiman Olayan, a distinguished Saudi businessman, summed up Aramco's contribution to his career: Aramco, he said, 'was my university.'

Taking advantage of Aramco's loans, advice and equipment some of these men started by providing Aramco with goods and services unobtainable in the Eastern Province, and then, later, started to provide the same goods and services to Saudi Arabia, and, in some cases, the whole Middle East. These men and many like them offer overwhelming proof, I think, of how Saudis, and other Arabs involved with Aramco, made important contributions to the company almost from the beginning.

This group includes men who have made their fortunes – and enhanced prosperity in the kingdom – in fields ranging from banking to baking, and from con-

struction to equipment supply and cement manufacture. Some are internationally known; others have names that are well-recognized in Saudi Arabia today. Among them number Ahmad al-Gosaibi, Sulaiman Olayan, Abdullah al-Matrood, Nassir Hazza', 'Abd Allah Fouad, 'Ali 'Abd Allah Tamimi and Khalid 'Ali al-Turki.

Another category of Aramco alumni is those men whose company experience helped them make contributions to the government. They include Abdul Aziz al-Turki, deputy minister of petroleum and mineral resources; Mahmoud Taybah, governor of the General Electricity Organization; Dr. Jamil al-Jishi, deputy governor of the General Electricity Organization; Hassan Mishari, formerly deputy minister of finance and national economy and minister of agriculture and water; and Abid Shaikh, formerly Saudi Arabia Monetary Agency deputy director and Saudi Arabia's deputy governor of the International Monetary Agency.

As early as the 1950's, Saudi Arab entrepreneurs were also beginning to supply goods and services that a major oil company requires – and by the end of the 1950's Aramco was certainly a major oil company. Indeed, it came into the 1960's with almost unprecedented achievements in the records. Production was up to 1,095,399 barrels a day in 1959 – a daily total far in excess of any other producing company in the world – and exploration, still working on the peninsula's elusive structures, had outlined most of the giant Ghawar field and found still another off-shore field: Manifa. Facilities to move the oil, process it and ship it, moreover, were changing the skyline of the entire province.

In the 1960's, production continued to soar. In 1962, Aramco's cumulative total reached five billion barrels, in 1964, seven billion and in 1968, 30 years after going into commercial production, 10 billion barrels. That same year Aramco produced a full billion barrels in just 358 days.

To maintain such an enormous flow of oil, Aramco, of course, had to continue to find and produce new oil, and the Exploration Department, as it had done with methodical regularity since Dammam No. 7 came in, continued to score. In 1963 alone, the company's 25th year of commercial production, a new offshore field, 'Abu Sa'fah was discovered, the Fadhili and Khurais fields came on stream and work was started to bring in oil from Haradh, Hawiyah and southern Uthmaniyah – all segments of the vast Ghawar field. And in 1966 as the first sea island platform arrived from England, the exploration department also announced discovery of the offshore Zuluf field.

This discovery, about 40 miles northeast of shore facilities serving the offshore Safaniya field, led to a radical – if temporary – change in procedure. In 1959 Aramco had built a gas-oil separation plant (GOSP) offshore to separate gas from crude oil produced at Safaniya, another offshore field, but only to reach the first stage of separation. Now, for the Zuluf field, Aramco moved the *entire* gas-oil separation process offshore. Crude oil from Zuluf wells flowed into a plant mounted on piles above the sea, where the gas was removed, and sent on through underwater lines to an unusual 1,800,000-barrel floating storage tank. This tank, actually a stationary oil tanker named the *F. A. Davies* – after the late chairman – was anchored in the Gulf; after it was loaded, the oil was pumped to other seagoing tankers moored safely a mile away.

"One result of the enormous production was development of economically feasible ways of using some of the 'associated gas' that was produced with the oil. Though some was used as fuel, much of it, because it is highly corrosive, was burned as a safety measure. By the 1950's however, studies indicated that associated gas might be a valuable addition to the world's energy sources and so, in 1960, the company constructed a plant in Abqaiq to compress and liquefy what are called natural gas liquids (NGL) – composed of propane, butane and natural gasoline. The initial components targeted for sale were propane and butane, known as 'liquefied petroleum gas' or LPG – which was processed at the Ras Tanura refinery and, on December 6, 1961, first shipped to customers.

*Aramco's first gas processing plant – Abqaiq, 1960.*

Later, as demand climbed, LPG facilities were expanded. In 1962 LPG capacity stood at 4,000 barrels a day; it went to 35,000 barrels in 1967 and in 1972 to 89,000 barrels a day. By 1984, design LPG processing capacity had been increased to 600,000 barrels per day, the equivalent of 850 million standard cubic feet of gas.

In 1967, in response to growing market demand, Aramco began to export the natural gasoline portion of the NGL. The three NGL components – propane, butane and natural gasoline – plus sweet fuel gas and ethane derived from associated gas would, in the 1970's, have a tremendous impact on the future of Saudi Arabia.

Another sign of Aramco's growth was in the air. Indeed, from the day that Kerr and Rocheville landed the single-engine Fairchild monoplane in Jubail, aviation has been an integral part of Aramco life – if only because at first there wasn't any other way to get in and out of Saudi Arabia except a variety of rather slow freighters, tankers and launches.

By 1946, the company could boast that 'seven aircraft, either owned by or under charter to the company, were flown a total of 370,215 air miles.' By early 1948 Aramco was operating a fleet of 22 planes including eight Douglas DC-3's and two Douglas DC-4's that would immediately become part of the legend when Aramco opened its own air services between New York and Dhahran.

The first DC-4 put in service was called the *Flying Camel*, the second the *Flying Gazelle*. They had four engines, but were not pressurized and made, by today's standards, innumerable stops for fuel. Furthermore, the plane, crew and passengers, usually had a layover of one full day and night, usually in Lisbon or Rome.

Several times, these aircraft flew directly from New York to Jiddah with the British gold sovereigns Aramco needed to make its early concession payments, and I noticed once in 1948 on the *Gazelle* that the first two sets of seats on both sides of the aisle were unoccupied; there were just four little kegs tied to the floor between the seats.

"In 1960, management decided that commercial carriers could provide more and better service. So, on New Year's day, 1961, the company's last international flight left Dhahran – after completing 2,420 Atlantic crossings.

The Aviation Department, however, continued for operational reasons, to run scheduled flights along the Trans-Arabian Pipeline and across the peninsula to Riyadh, Jiddah and Asmara in Eritrea. Occasionally, flights were also sent to Europe and the United States. We never did go back to running our own airline, but in 1978, we initiated a Boeing 707 air cargo charter, and the following year introduced a chartered twice-weekly jet passenger service from Houston to Dhahran; in partnership with Saudia in 1981, Aramco contracted with Trans-America in the operation of a new 747 cargo-passenger charter linking Houston and Dhahran.

In retrospect, Aramco's flying and air safety record was remarkable. In fact, the air tragedy that shook the entire Aramco community on April 18, 1964, was not an Aramco flight at all. April 18 was the night that Middle Eastern Airlines Flight 444 from Beirut went down with the loss of 42 lives, 22 of them Aramco employees, Aramco wives and Aramco children.

On that night, husbands, wives, parents and friends had gathered, as was customary then, at Dhahran's striking new terminal. They were waiting for Flight 444 – an MEA Caravelle due in from Beirut. At first they thought it was late, but even when it didn't land at all, they were not alarmed; during *shamals* – violent sandstorms – planes were often diverted.

By the next morning, however, the rumors were starting to flash from house to house: 'Flight 444 is missing'... 'a search is underway'... 'management has set up a command post at Aramco's hangar'... 'there's a rumor that...' Slowly the hours ticked by. The tension grew. Then, about 11:30, a British Navy helicopter radioed in a report to the command post ...found the plane... in the water... upside down...'

"One reason that disaster affected Aramco so deeply, I believe, is that by then Aramco was much more than just 'an oil company.' We had become a community in the best sense of the word – which is why, I think, we were all especially pleased when, in 1962, Tom Barger became chief executive officer – and when, on January 1, 1984 Ali Naimi became president. They were *ours*.

Let me digress here, since we are talking about former executives, to mention some other presidents and chairmen of the board. Tom Barger, for obvious reasons, tends to be the one we talk about most; a sort of Renaissance man, Barger is undoubtedly a favorite of the old-timers. But that's not entirely fair to some of the other brass that came along after – most of whom, incidentally, Barger helped and encouraged: Liston Hills, Robert I. 'Bob' Brougham, R. W. 'Brock' Powers and Frank Jungers.

Aramco executives, as I said earlier, were a disparate group of men. Liston Hills, for instance, took a leave of absence from Casoc to serve as an officer in the U.S. Navy during World War II, and there was something besides his kindly looks that reminded you of Henry Fonda in the role of Mister Roberts. Liston was a kind and thoughtful engineer without an enemy in the world.

*Storage tank construction – Ras Tanura, 1968.*

Then there was Bob Brougham, one of the few executive officers who was not an engineer. Bob, in fact, didn't even have a college education. But he was Wall Street and Madison Avenue rolled into one: good looking, a sharp dresser and a first-rate tennis player, with a talent for numbers matched by the wit and energy necessary for a big time oil negotiator. Brougham, furthermore, had worked his way up from office boy in the Jersey-Esso-Exxon organization, before coming to Aramco as vice president of Finance.

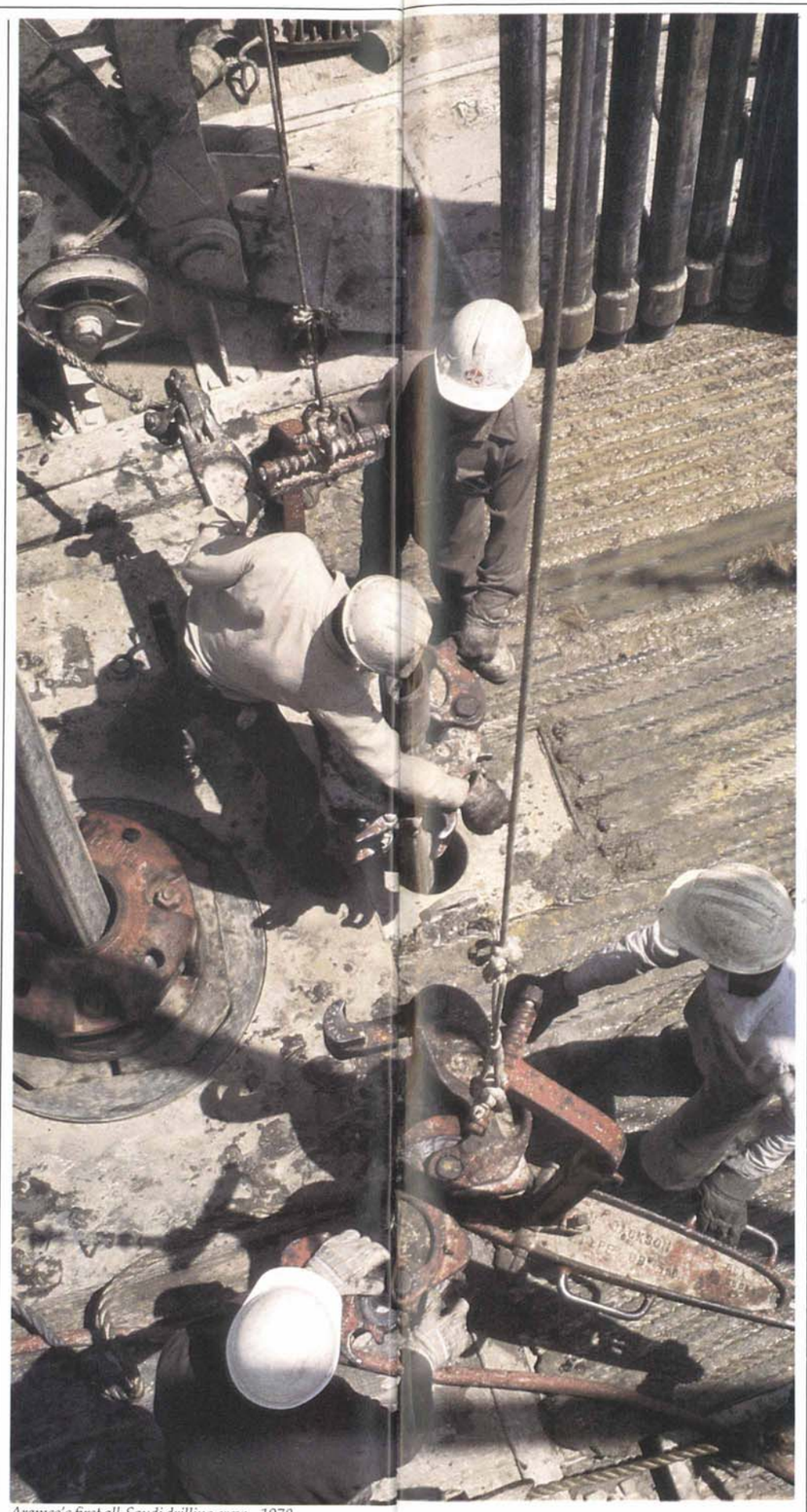
I must also mention Brock Powers, another of 'ours,' who moved up to the presidency, and, of course, Frank Jungers, who was called a 'great' engineer by his peers, and who was chairman from late 1973 to early 1978.

But back to Barger. As boss of Aramco in the 1960's, Tom Barger had his work cut out for him. For one thing, Aramco's average daily production had begun to outstrip anything ever seen before; in 1965 it reached the two-million-barrels-a-day-mark, by 1966 it was 3,548,865 barrels a day, and over the next four years made an average gain of 1,165,209 barrels per day each year, to arrive at 8,209,703 barrels a day by end of 1974.

To handle such massive volumes of oil, Aramco, earlier, had enlarged and increased the number of its facilities. Just to store the oil, for example, Aramco had to enlarge the capacity of its storage tanks. In the early 1960's, that capacity was 268,000 barrels per tank – but the size went quickly to 322,000 and then, a big jump to 500,000 barrels. And even those sizes were not the ultimate. By 1975, Aramco had erected five tanks big enough to accommodate a football stadium – they have a capacity of 1.25 *million* barrels – and by 1980 had put up five 1.5 million-barrel tanks which went into the *Guinness Book of World Records* as the largest oil storage tanks ever built. The tanks stand today in Ju'aymah – now the company's second oil port.

In the 1960's, of course, Ju'aymah didn't even exist. But then, in 1967, when the ' Six-Day-War ' broke out, mines, sunken ships and unexploded bombs put the Suez Canal out of commission for what would be a total of eight years – a closure that would transform petroleum transport and, as a consequence, demand more deep-water ports and a revamping of Aramco's terminal operation.

Actually, Aramco's marine terminal specialists had been enlarging its facilities regularly since they were opened. From a single pier able to dock two small tankers, the terminal had grown to two piers with a total of 10 berths, and by 1966 we had ordered, received and put in operation what was called the 'Sea Island,' a series of steel loading platforms welded together and standing in deep water. The island's first platform, with two-berths, was jacked into place a mile off-shore from the Ras Tanura terminal and one of the first tankers to call was the *Tokyo Maru* – a VLCC (meaning 'very large crude carrier'). Then the world's largest ship, the *Tokyo Maru* loaded more than a million barrels of oil. By the spring of 1967, the second platform was also ready for use, adding two more VLCC berths.



*Aramco's first all-Saudi drilling crew – 1978.*

# Al-Ghanim: "The second generation has something unique"

INTERVIEWED BY JOHN LAWTON

"*The first generation of Aramco's Saudi employees,*" *said Abdulla al-Ghanim, "had strong characters and were hard workers. They provided a lead for other Saudis to follow – that was their contribution to Aramco. But the second generation came better equipped."*

*Al-Ghanim, now vice president of the Gas and Refinery Project Management, can speak knowledgeably on both generations; his father, Ghanim ibn Abdulla, belonged to the first, and he himself to the second.*

*Ghanim ibn Abdulla, who joined Aramco in 1936, drove trucks and exploration support vehicles, and also encouraged others in his village – Dhruma, near Riyadh – to move to the Eastern Province, where work was readily available at Aramco. A man with a sense of community, he also helped in the settlement of such workers in al-Khobar. As his son said, he provided a lead for others to follow.*

*Al-Ghanim, as a result, grew up in al-Khobar, the small port town near Dhahran that has subsequently developed into a shopping and residential area. He recalls diving and swimming off the al-Khobar pier, from which, before the days of pipelines and tankers in Saudi Arabia, oil was shipped by barge to Bahrain – in barrels. "That's where the measurement comes from," he added.*

*In al-Khobar, al-Ghanim reached the sixth grade, then attended school in Hofuf and, like so many boys of that age at that time, he joined Aramco – studying full time for the first three years at an Aramco school, then working mornings and studying afternoons for another three. He also studied nights at a government school –" to keep my options open."*

*It was a good thing he did. "In 1960, when I had to start working full time, I told my supervisor that if Aramco would not send me out of kingdom for a degree in engineering, I would switch to the government school system. I was called into the director's office. He picked up the telephone and dialed the school to check on my grades. The average was over 95. He replaced the receiver and said: 'Tomorrow you re-start education full time'." That exchange took place in the office close to the one in which al-Ghanim now sits as an Aramco vice president.*

*From Dhahran, he went on to high school at the International College in Beirut, moved over to the American University of Beirut and, two years later, was offered an opportunity to go to the United States. There, he earned a B.S. in mechanical engineering at Bucknell University, Pennsylvania, then returned to work full time for Aramco in 1968.*

*"My first job was to take care of several projects handled by an expatriate engineer who was going on vacation. It was the best thing that could have happened to me."*

*During five years in design and three in operations, al-Ghanim was involved in a wide range of projects including installation of Aramco's first wet crude handling facility and powered water injector – both to enhance oil recovery – and was among the first Arab engineers to work on the application of computers to the oil industry.*

*Then, after an assignment as superintendent of the Abqaiq Producing Division, he returned to engineering and in 1976 was named chief projects engineer. He subsequently held positions of increasing responsibility in The Hague – where he was manager of engineering at the Aramco Overseas Company, an affiliate in The Netherlands – and in Dhahran, including general manager of the Projects Design and Construction Department, and chief engineer.*

*The second generation of Saudi employees has something unique, al-Ghanim said: "adaptability." He explained that the new generation had to adapt – suddenly – to a space-age world and its new demands. "From barrels to pipelines, from neighborhood school to UPM [the University of Petroleum and Minerals in Dhahran] and from the village of al-Khobar to a large town."*

*And the third generation – which includes his son Abdul Latif, 20, attending college in Pennsylvania on an Aramco scholarship "will have to fill the growing need for professional and technical staff at Aramco, so we need to encourage and develop cadres of engineers, geologists, computer scientists, surveyors, lab technicians, inspectors and corrosion engineers."*

*This, in fact, has started. With the launching of Aramco's Professional Development Program – a three-year career course for university graduates – and Aramco's Saudi Technical Development Program, to train high school graduates as support personnel, including assistant engineers, Aramco has already begun to prepare for the future – a Saudi Arab future.*

Despite the disruptions caused by the war, therefore, Aramco continued to push oil through the terminal. Aramco, moreover, continued to add platforms, so that when it was completed, the Sea Island measured 1.1 miles in length (1.7 kilometers), could load a total of 439,000 barrels of oil per hour and could accomodate eight tankers.

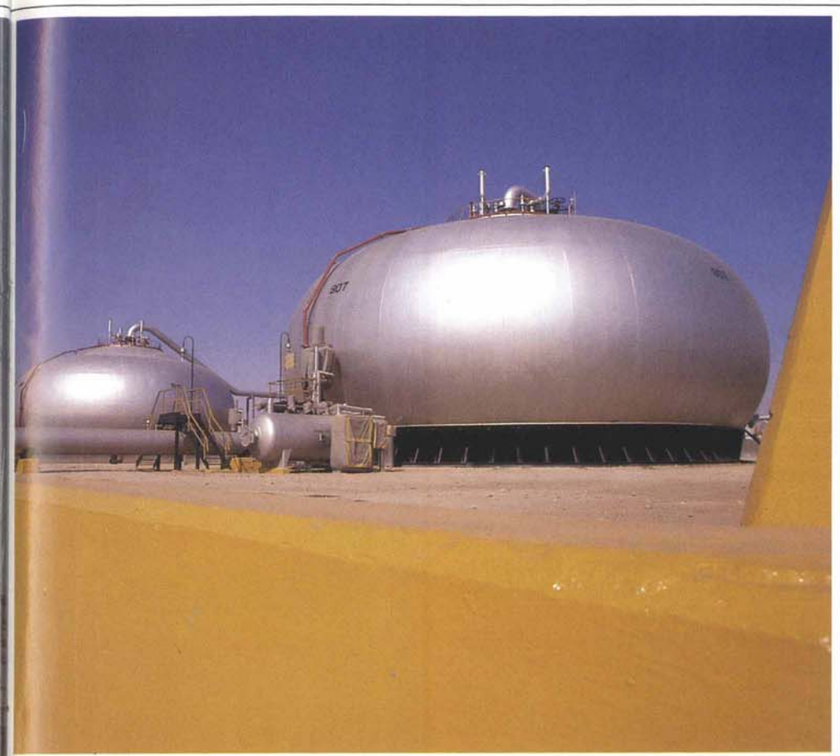
At that time – the end of the 1960's – we thought construction of facilities like the sea islands was a major undertaking. But then came the 1970's, the decade of development.

"Within Aramco, the 1970's also brought the first fruits of those industrial training and educational programs introduced years before. As I said, Saudi Arab employees had begun to move up through the supervisory and managerial levels long before, but now, on September 1, 1974, Faysal al-Bassam became vice-president of Public Relations – Aramco's first Saudi Arab vice-president. A year later, the second was chosen: Ali Naimi, vice-president of Producing and Water Injection, a man who, in the Horatio Alger tradition, started as an office boy, and in 1984 became the company president. By 1984, management ranks included two Saudi senior vice presidents, 17 vice presidents and executive directors, 14 general managers and the comptroller and assistant comptroller, 74 managers and directors and 268 administrators, supervisors and coordinators – in fields such as industrial services, refinery, producing, budget planning, public relations, industrial relations, power systems, computer science and engineering.

Similarly, the influence of Saudi Arabia in the 1970's began to reach throughout the world.

Although few in the West were aware of it, the economic importance of Saudi Arabia had been growing quietly throughout the 60's as, year by year, Aramco geologists continued to find more and more reserves. As a result, the kingdom came into the 70's as the single most important source of potential oil production in the world – and one of the four top producers. Simultaneously, King Faisal, who succeeded his brother Sa'ud, began to press for an increased share of oil revenues – initially through his newly famous oil minister Ahmed Zaki Yamani.

Yamani is a household name today, of course, but in 1962, when he became Saudi Arabia's second minister of petroleum and mineral resources, he was relatively unknown. Born in Makkah (Mecca), he studied at Cairo University, New York University and Harvard, served as



*Gas processing facilities – 1980's.*

advisor to the the kingdom's Council of Ministers and as chairman of OAPEC (the Organization of Arab Petroleum Exporting Countries). During those assignments, and many others, Yamani quickly mastered the details of the petroleum industry. When King Faisal, in the early 1970's, decided to press for price increases, therefore, Yamani quickly caught the West's attention as an eloquent spokesman and brilliant strategist on energy. This was to prove important with the so-called "energy crisis" in 1973 and an extraordinary expansion of our production: from less than three million barrels of oil a day in 1969 to a production average of 7.3 million barrels a day by 1973.

To those of us who had been through it before, expansion wasn't all that exciting anymore. But to up-and-coming Saudi executives it was meat and drink – as Abdullah S. al-Saif told an *Aramco World* reporter in an interview in January.

Vice-president of Southern Area Manufacturing al-Saif came to Aramco as an accountant, but quickly realizing that it was 'not what I wanted,' moved toward petroleum engineering. He won a place in the first group of Saudis to be sent by Aramco directly to the United States – rather than via Beirut – for higher education, and gained a B.S. in petroleum engineering from the University of Oklahoma in 1970.

It was a good year to do just that. Soon after al-Saif returned to Saudi Arabia, Aramco took off – as the kingdom and the company, becoming what we called 'partners in growth,' began to work to the beat of industrial growth at its most exciting: making, revising and re-revising plans, estimating and re-estimating budget items in a leapfrogging process summed up wryly by one exasperated engineer coming out of a meeting: 'Well, there's another two-week job they want in two days.'

Such comments came to be common. Virtually everyone involved was overworked – and loved it. As one executive put it then, 'there's too much to do and not enough people or time to do it, but I have learned more in six months here than in 10 years in the US.'

The emphasis, naturally, was on production, but expansion touched every other department too. What we called 'Community Services', for example, felt the pressure as soon as the first wave of new engineers tramped into Dhahran looking for beds to sleep in and desks to work at – and found that both were in short supply.

To us, veterans of earlier expansion programs, this was amusingly familiar. Back in the post-war period, Aramco's engineers, gearing up for *that* expansion, designed a completely portable camp: squarish wooden buildings of the same size, which

# Fate: "The early people had the foresight to set a different course"

INTERVIEWED BY DICK HOBSON

*"I was just 22 when I joined Aramco," recalls Don R. Fate, now senior vice-president, Manufacturing, Supply and Transportation. "I was one of the real young ones. In fact, I thought of myself as being one of the young ones out here for a long time, until all of a sudden I looked around and noticed a lot of people were younger than I was."*

*Fate has spent all of his working life with Aramco, and all but 12 months of it in Saudi Arabia. In fact, he has the distinction of being the longest serving American employee at Aramco in Saudi Arabia. "It's one of those number-one's you're not sure you want to be," he chuckles.*

*"I've always felt this was where the action was. We've had our hills and valleys, and I've seen it go through three or four cycles. We're in a little bit of a valley at the moment, but when we've been on the upswing, why then this has been an exceedingly exciting place to be. Nowhere else in the world are you going to see the activity level like we've seen here. You just won't even see these kinds of projects elsewhere in the world. We were building five gas plants as a single program. That was unique. Nowhere had any private company ever attempted anything of that magnitude. Then, shortly after we got started [on the Master Gas System], we got into managing SCECO [the Saudi Consolidated Electric Company]. This was on top of all the other things that you're normally doing. Either one of those by themselves would have been a major achievement, but to do both of them simultaneously really staggered us for a while."*

*Above Fate's desk in his office on the third floor of the Administration Building East in Dhahran, is an old black and white, panoramic photo of Dhahran, taken in 1946, the year before Fate arrived in Saudi Arabia. The photo makes Dhahran look like an old mining camp during the California Gold Rush. "Dhahran wasn't much different than this picture," says Fate.*

*"Actual living accommodations are so much better than what we had originally. We didn't have air conditioning in the autos until the mid-60's. I got one of the very first ones [in Abqaiq]. Oh boy, what a pick–up that was! . . So life was a lot more difficult. I think it was more of a pioneering scene. I've got a swimming pool at the side of my house today. That would have been unthinkable 30 years ago, 20 years ago, even 10 years ago.*

*"One of the biggest changes certainly here at Aramco was that communities were much smaller in those days. So you knew everybody. Not only would you know everybody in Dhahran . . . but you would end up knowing almost everybody around. It seemed like you did things more as a group than today. I was kind of one big happy family. Today . . . I swing by the mail center at night and I'm lucky if I know one or two people out of 100.*

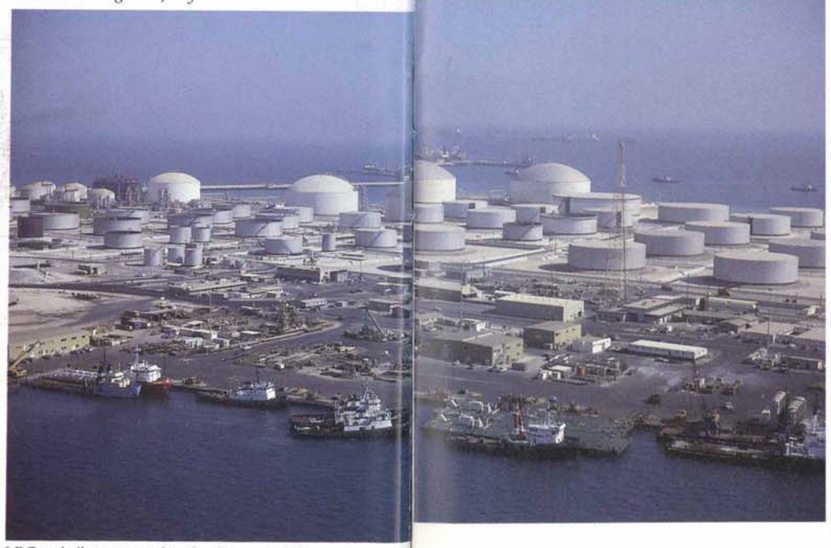
*"I think the early people who ran the company had a different perception and philosophy in terms of dealing with the people here, both the individuals and the government, that was rather unique for its time. I think the early people had the foresight to set a different course. Rather than just coming in here to exploit the thing for all they could and get in for the fast buck and out, it was always the idea that they were in for the long pull.*

*"When I first came out here, we were doing everything we could to increase production. Every drop we could produce in those days we could sell. The only problem was how to get a few more barrels out and up to Ras Tanura.*

*"During the time I was chief oil dispatcher [1950-51] we filled Tapline with oil. I still remember that number. It took 4,896,000 barrels to fill that pipeline and it took us six months. Again, we were in the situation that every drop of oil we could move to Ras Tanura we could sell. And, boy, it was painful to divert that many barrels into that pipeline to fill that thing up . . .*

*"During the 1967 [Arab-Israel] War, we shut down all our oil activity for about two weeks. I think that was the first and only time it was ever shut down since the late World War II period. I remember we got the word to start up. The senior vice-president of operations in Dhahran called up and said, 'All right, how long is it going to take you?' and I was sitting there in Abqaiq looking at the ceiling thinking, 'Gee, we've never done this before.' And I said 'We'll be up to 80 percent in 16 hours, and we were at 85 percent in 16 hours . . . You just kind of leaned back and pulled it off the top of your head."*

*A tanker loading oil at Ju'aymah – late 1960's.*



*LPG and oil storage tanks – Ras Tanura, 1983.*



could be jacked up on wheeled dollies and moved from place to place.

In the 1970's, history repeated itself: Aramco again started building camps for the great numbers of contractor employees expected for expansion. This time, though, the company was able to turn to other kinds of portables: housing derived from the mobile home industry and – a sensation in Arabia – the housing barges. These were multi-storied living accommodations constructed on barges in Japan and then towed to various moorings near construction sites along the Arabian Gulf and the Red Sea.

Engineering Services, naturally, was the group on the firing line. Charged with designing oil facilities and then either building them, or seeing that they got built, engineers faced not only the same dizzy growth as the rest of the company but also uprecedented responsibility and drastic change.

Early in the planning stage, for example, company management, in a radical reorganization, created a new corps of 'project managers' each of whom took on a project at the study stage and proceeded to develop the economic concepts, supervise design, define the engineering, arrange the flow of supplies and materials, set up cash flow and accounts, oversee the selection of contractors and run the show right to going on stream. As the expansion projects got bigger, this system was to prove invaluable, and Aramco has it still.

Outside Dhahran, expansion soon began to transform the Eastern Province – literally. On a plane tour with an *Aramco World* writer one day, he and I could actually see what was happening and this is the way he described it in 1973: 'Out in the field . . . expansion is a giant tangle of concrete and steel pushing up from a post-construction clutter of churned sand, broken pipe, fragments of timber and carbon, old rags and paint cans. It is overlapping waves of high-decible hissing breaking over helmeted workers in sound-proofed earmuffs. It is batteries of 48-inch silvered pipe looping in and out of a concrete trench 120 feet wide . . . a stabilizer twice the size of any stabilizer built anywhere before . . . a Kenworth 953-A truck, loaded with pipe, creeping slowly up a long grade toward construction sites in places called Shedgum, 'Ain Dar and Uthmaniyah.'

Changes arising from expansion went even deeper than physical change however. By 1972, to give one example, contracts for local services reached 7,700 and a significant portion of purchases were being made from vendors' stocks: up $17 million between 1969 and 1973.


INTERNATIONAL
Herald Tribune
Published with The New York Times and The Washington Post

MAN ON MOON

*Two Astronauts Land Craft Safely, Prepare to Walk on Surface Today*

Other News

Nixon Leads U.S. in Prayer For Astronauts' Safe Return

Red Craft Enters New Orbit Nearer Moon

*Man's Advent Pollutes the Moon And Complicates Task of Analysis*

"One of the most dramatic signs of Saudi Arabia's impact on the local economy dates from the year 1975 when the government announced its plans to construct the Master Gas System – and the value of contracts let by Aramco to local enterprises for construction and services began to leapfrog. Some 400 major contracts with Saudi firms worth $250 million were awarded in 1975; one year later 620 major contracts valued at $1.7 billion went to Saudi firms; and in 1977 the value of major contract awards to Saudi companies came in just shy of the $2 billion mark.

Impressive expansion in the numbers and levels of skills at the grass-roots level also came about – the result of huge training programs that both Aramco and Aramco's contractors instituted at the request of the government. But even so, according to Aramco's director of training at that time, the company's training programs could not keep up with demand. 'In January, 1971,' he said, 'we hired 118 apprentices, and by 1972 it was 457. Then, in 1973, 800 contractors working on expansion projects also opened training programs for Saudis at all levels of craftmanship: welding, pipefitting, electricity, etc.'

'It was part of a gigantic effort,' as one contracts expert put it at the time, 'to give Saudis the hands-on-the-throttle skills they will need when expansion is eventually completed. We cannot depend on foreign workers indefinitely, and these programs should ensure that we don't.'

"To a great extent, that hope has been fulfilled. Expansion opened up promotion possibilities for veterans, attracted promising newcomers, and gave all a chance to try their hand on important projects.

Esam Mousli, manager of the Communications Technical Support Department, was one of the first home-grown Saudi graduates to join Aramco. Having attended high school in Jiddah and earned a degree in electrical engineering at the University of Petroleum and Minerals (UPM) in 1974 in Dhahran, Mousli was among the first group to graduate from UPM.

By then, Mousli said, Aramco was not the only major source of jobs for specialists. But he chose Aramco anyway – 'I viewed it as a place to get real experience' – and later earned a master's degree in business administration at Drake University in Des Moines, Iowa. 'I came back in 1978 to find Aramco had suddenly taken a different shape -- larger departments, more people, more nationalities and a different approach to . . . handling things. The results of decisions taken in 1974 and 1975 were beginning to appear.'

*Esam Mousli, manager Communications Technical Support.*

Hamad A. Juraifani vice president of Northern Area Manufacturing noted changes too – but over a much longer period. "There have been many changes. My father owned a camel caravan. I once went with him to Ha'il to buy young camels. It was a 15-day walk. And it took seven days to travel by truck from 'Unayzeh to Ras Tanura in 1951. There were no proper roads. Now we have six-lane highways.

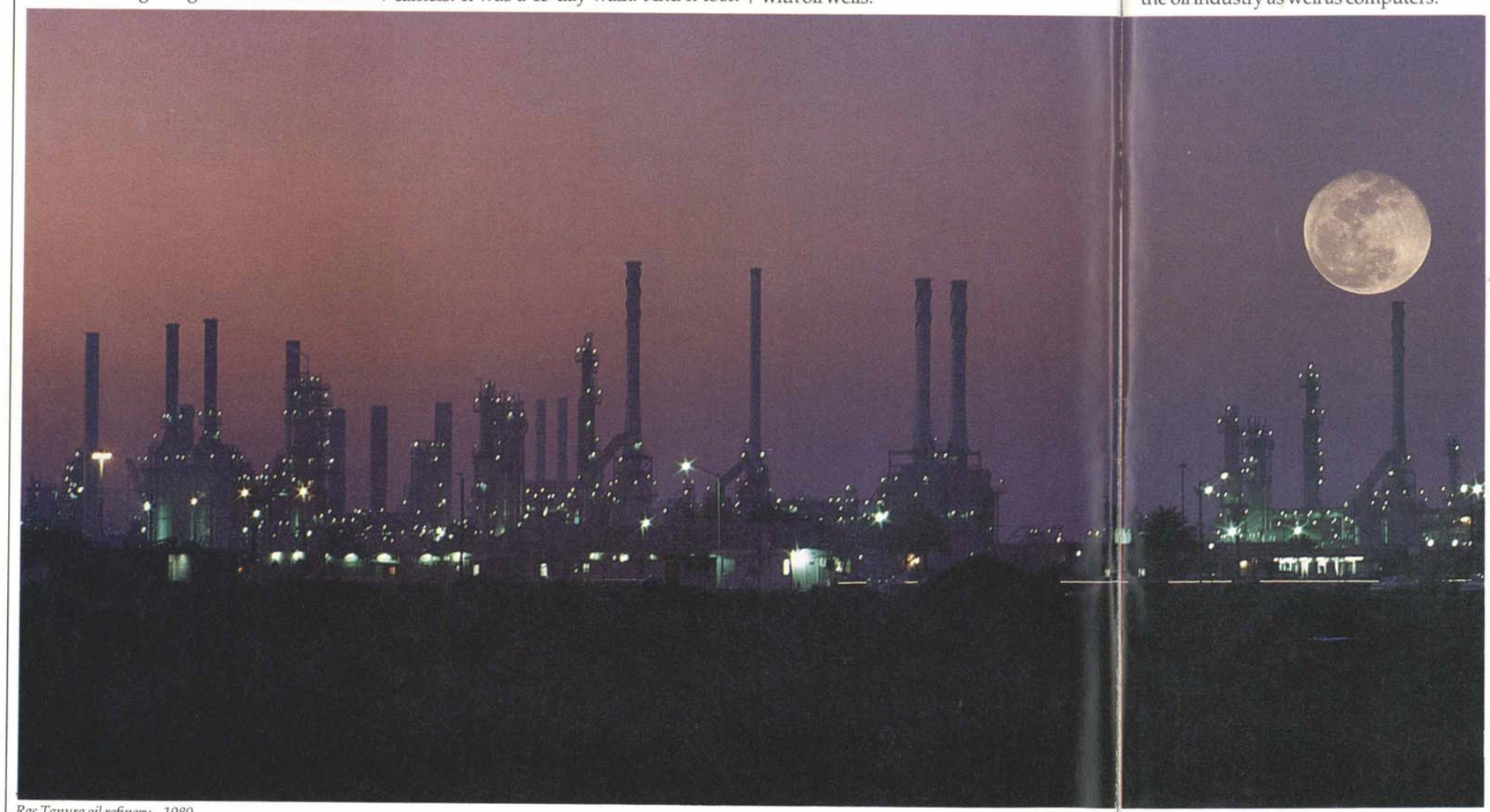
But, he added, Aramco's role has not changed, nor will it change. 'Aramco will continue to be looked at [by the government] as a company that can undertake big projects. . . . And, he added, it will continue to provide help in the development of Saudi Arabia. 'Aramco is an excellent source of trained manpower. Although we have lost a lot of experienced Saudis to the private sector, we Saudis [at Aramco] look at the big picture: what is good for the kingdom. So Aramco's loss is Saudi Arabia's gain.'

Salim Abu Khamsin, superintendent, Safaniya Offshore Producing, seems to typify the kind of independent spirit basic to upwardly mobile types everywhere. Though working in a remote area entailed 'some sacrifices,' he would never swap it for a desk job. 'I'm a field man. I want to get *involved* in the operation. Here, I'm dealing with oil wells.'

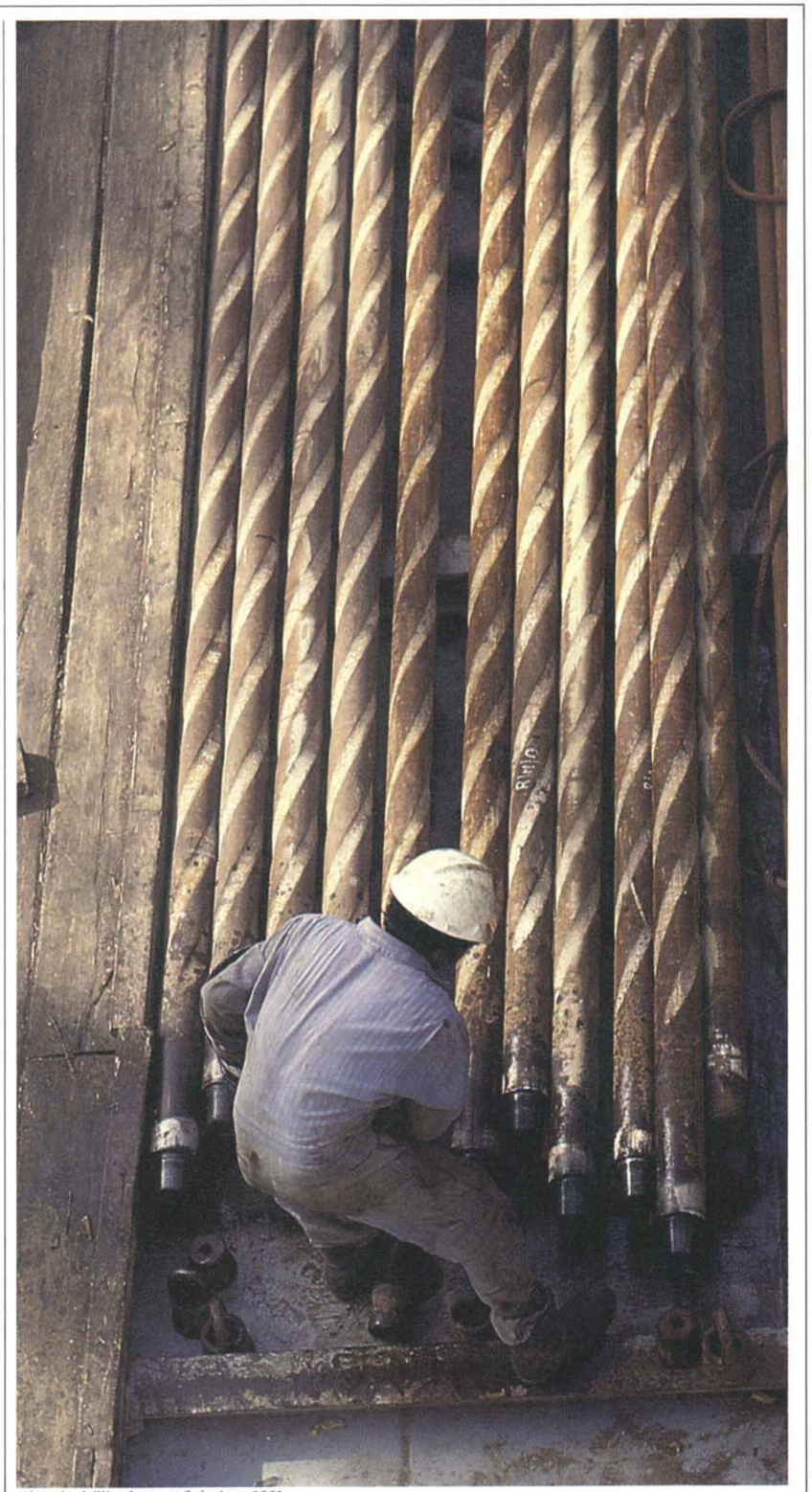
A graduate of UPM in 1973, Khamsin first went to work for the Arabian Oil Company in the Saudi-Kuwaiti Neutral Zone, but, after earning a master's degree in petroleum engineering, joined Aramco in 1978 for 'knowledge, experience and lots of diversity.'

To this, in Khamsin's case, one must add 'responsibility.' His job, in his own words, is 'to keep the oil wells flowing,' and though it's 'tough work,' he finds it satisfying. 'Sometimes you feel bad because of the isolation of Safaniya . . . But some Saudi has to do the job; we don't want to be spoonfed by expatriates.'

Challenge, in fact, seems to be a motive for most of the Saudi Arab middle managers interviewed for this Anniversary issue. As Ibrahim Mishari manager of the Computing Technology Department says, 'I was attracted by the scope of work and the challenge. I was becoming more aware of oil and its future importance, and . . . I chose . . . petroleum engineering . . . because I thought it important to understand the oil industry as well as computers.'



*Ras Tanura oil refinery – 1980.*

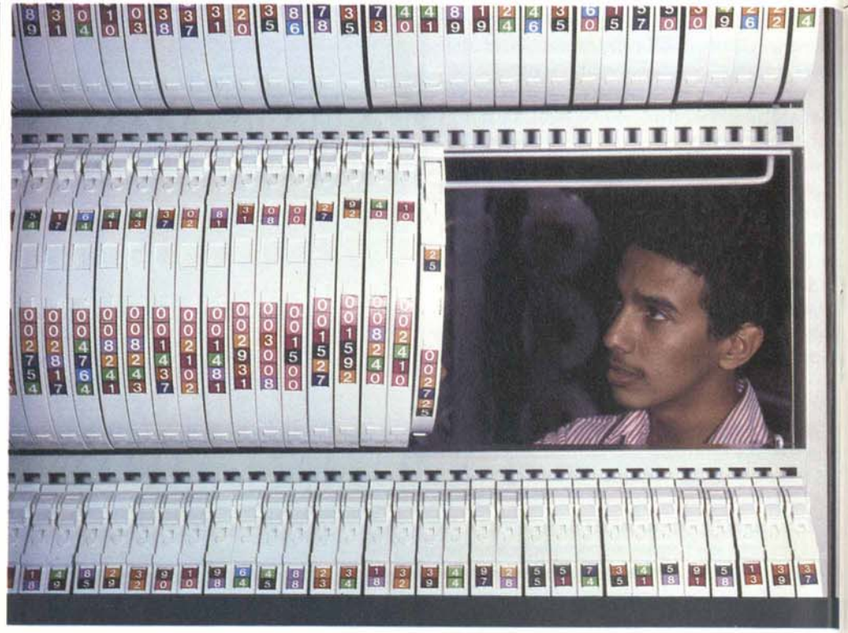


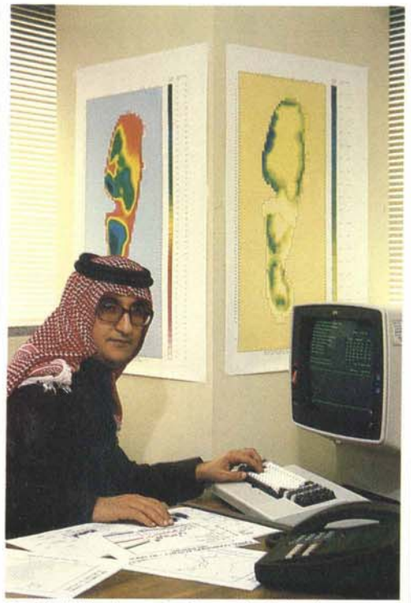
*Aboard a drilling barge at Safaniya – 1981.*

"A new breed of oil man, Mishari is a computer scientist with experience on a drilling rig, a background in production engineering and a one year assignment with Chevron, in the United States, working on reservoir simulation.

In the past, reservoir simulation for Aramco was largely done in the United States, but today sophisticated simulation work is done in Dhahran. 'The hardware, the software and the experience are all in place,' says Mishari who earned a Ph.D. in computer science in Great Britain, and who predicts that in 20 to 30 years new oil technology developed *in* Saudi Arabia will be exported to other oil producing states.

'Oil industry technology was developed in the United States because of the needs of the oil industry in that country. *They* had the problems and the resources to solve them. As our reservoirs mature (and therefore become more difficult to tap) *we* will have the problems, for which, because of our reservoirs' size, there will be no ready solution worldwide. The combination of



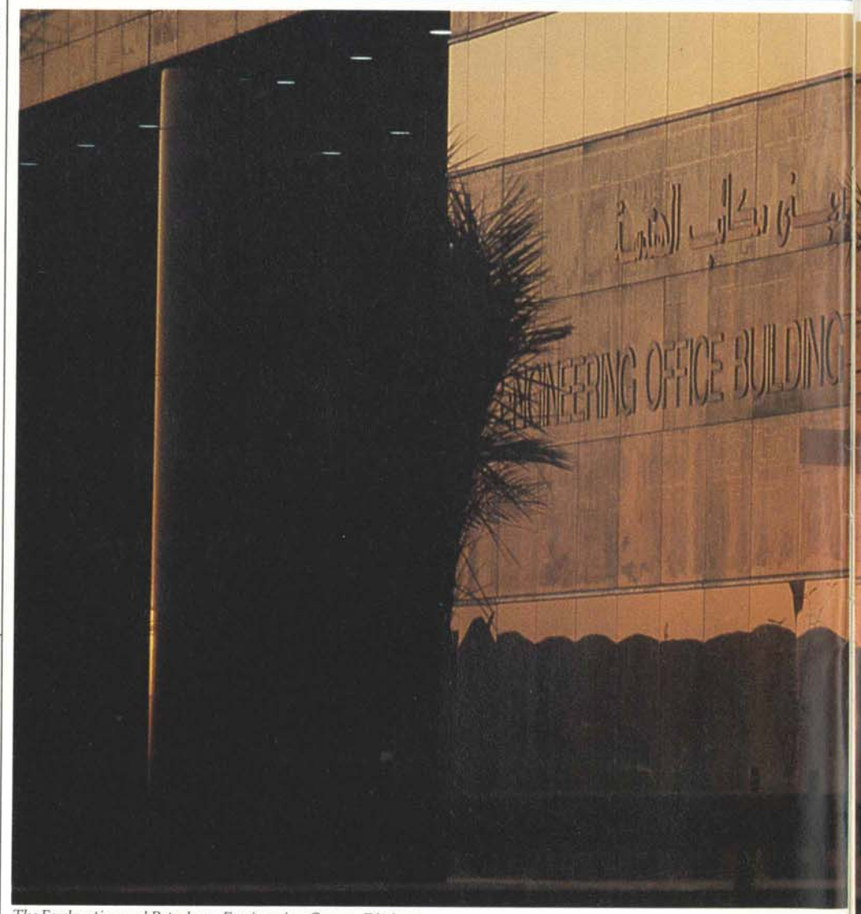


*Ibrahim Mishari, manager Computing Technology.*

this and the fact that *we* will have the resources make it [development of new oil technology in Saudi Arabia] inevitable. The first line of export [of this new technology] will be the Gulf because their reservoirs are similar...

As recently as 1975, views like that might have seemed wildly exaggerated. Now, though, in the wake of the second Five Year Development Plan launched in 1975, such opinions sound not only logical but likely. To modernize and industrialize an entire country in a few years, as that plan envisioned, required that Aramco and all its people work at the very edge of technology.

This was nothing new. Because it had such an enormous area to explore and develop, Aramco, even during the Kerr-Steineke-Barger period, always had to design, build or buy advanced equipment, break new ground, try new ideas, and test new methods. With the 1975-1980 plan, however, advanced technology became even more crucial. Although Saudi Arabia's 1975 program was really one of three five-year-plans, the earliest plan was mostly preparation and the latest plan is mostly consolidation. It was the 1975 plan that called for actual construction – the kingdom's unprecedented attempt to build such facilities as two of the world's largest airfields, two of the world's longest pipelines, two entire industrial cities, an enormous new oil port, a power grid capable of generating three times the electricity then consumed in Los Angeles and – the heart of the plan – the Master Gas System.

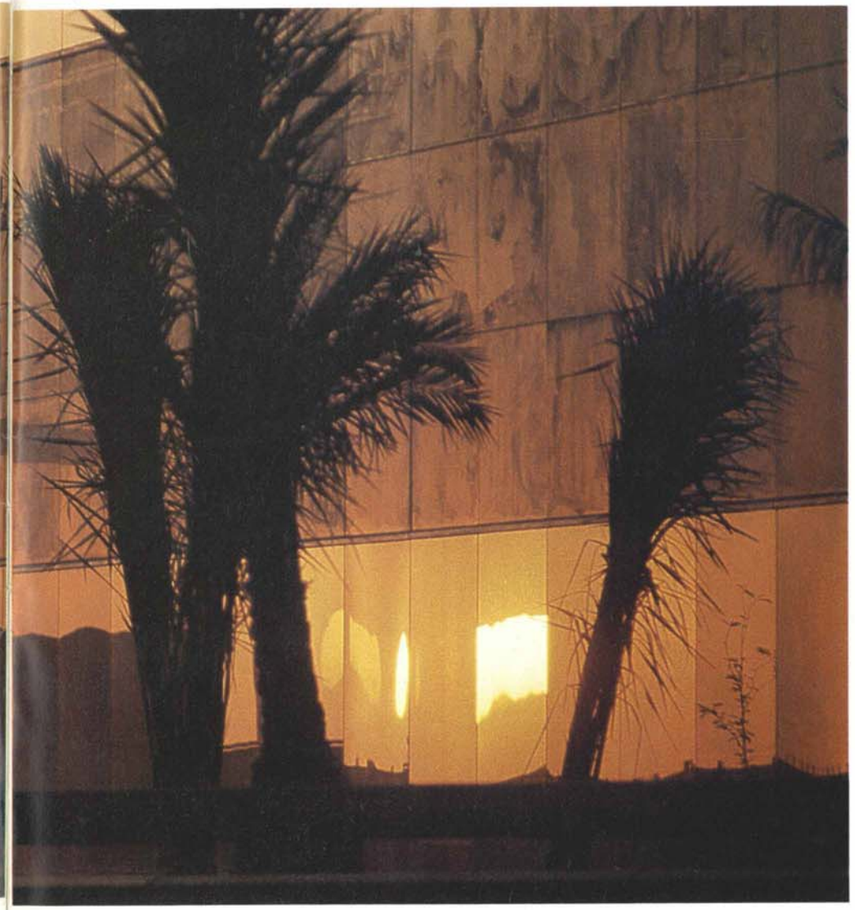



*The Exploration and Petroleum Engineering Center, Dhahran.*

In Saudi Arabia, electricity has been both a symbol and a pillar of modernization since its first municipal generator was switched on in Taif in the 1940's. Back then, the kingdom left the provision of power to private local enterprise, though later helping out with loans. Then the government began to sponsor power projects – notably in 1,500 villages in Asir and the southwest – and then, its most decisive move, established the first Saudi Consolidated Electric Company (SCECO). Set up in the Eastern Province, SCECO, with Aramco's help, hoped to provide a massive amount of electricity on a regional basis.

The original SCECO involved consolidation of 26 private power companies in the Eastern Province – plus Aramco's own high voltage network and the bulk of its generating facilities – into a single efficient unit. By the end of 1983, nearly all of the Eastern Province's 110,000 square miles (285,000 square kilometers) was served by SCECO.

In the Eastern Province, the oil-heart of the kingdom, the oil industry and a host of other customers, plus the new industrial metropolis at Jubail, require a lot of power. Along with some 67 gas turbines, SCECO East employs four giant 400-megawatt steam turbines at the kingdom's largest steam generation plant at Ghazlan on the Gulf coast, hub of the provinces 5,595 circuit-kilometers of transmission lines.

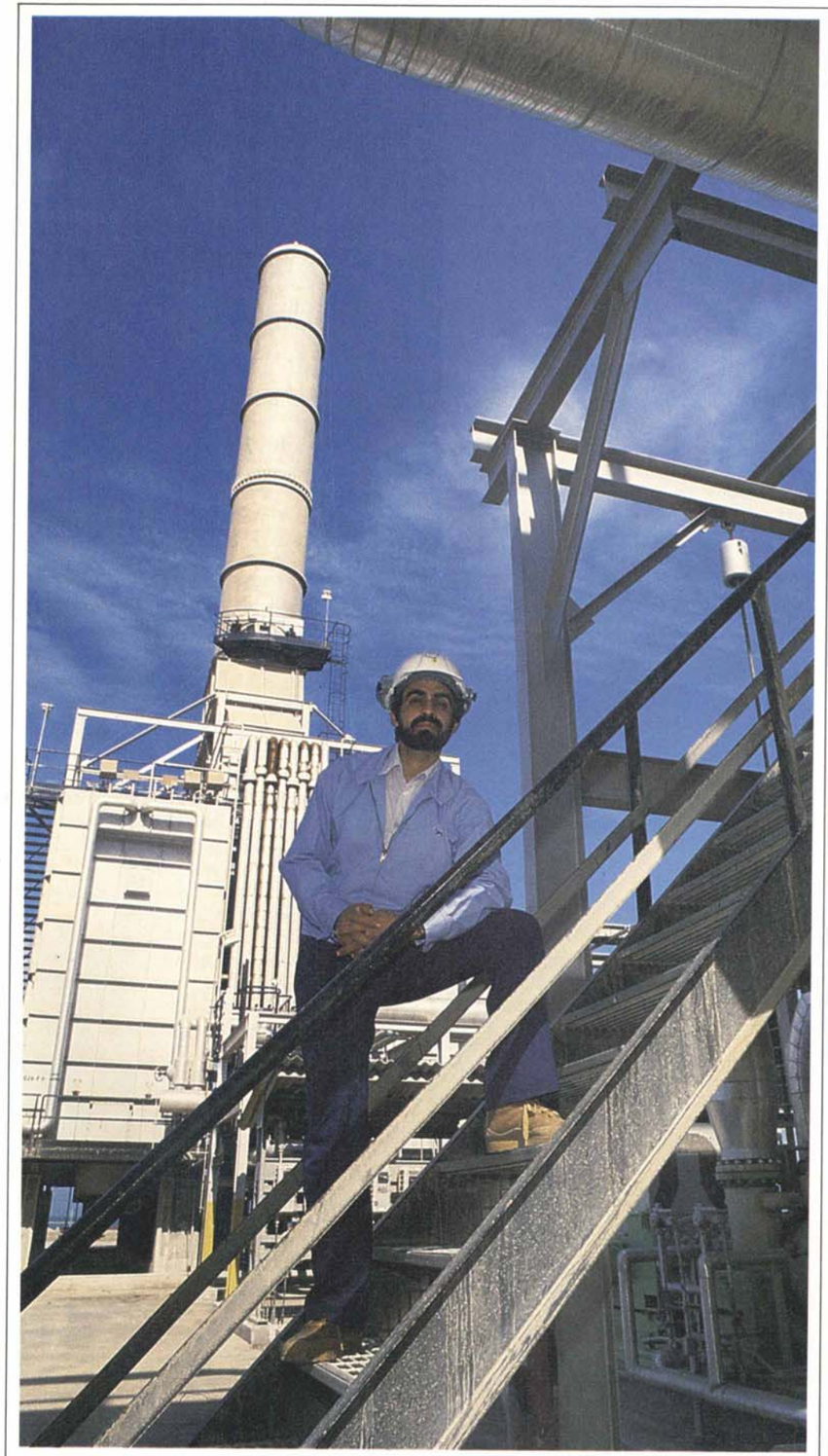


"A second major project for Aramco was a pipeline to carry NGL to the west coast. Along with a crude oil pipeline built close by – but not by Aramco – the NGL line, cutting across sun scorched dunes, cliffs, lava fields and rugged mountains, provides fuel and raw material for the giant industrial city being built at Yanbu', 300 kilometers north of Jiddah (186 miles). The two pipelines also provide Red Sea outlets for the export of gas and oil, the first new outlet, since Tapline's crude-oil throughput was reduced. Beginning in late 1978, the NGL pipeline was laid by a contractor's work force of 1,500 men, plus 100 support personnel, in less than 20 months.

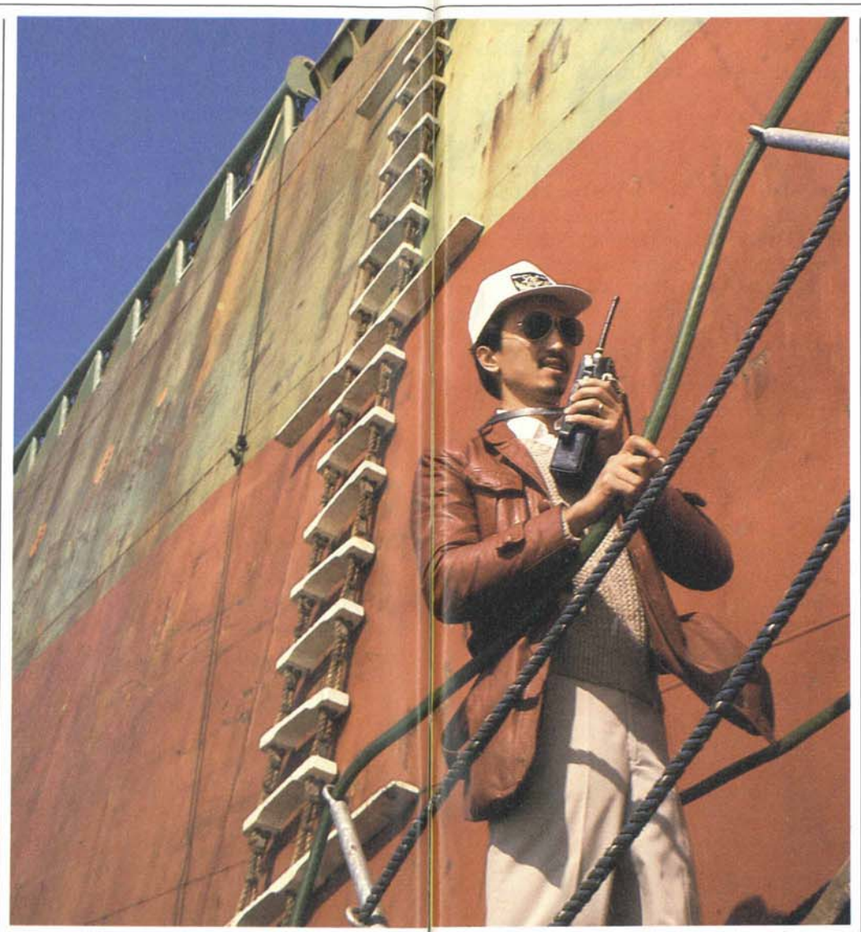
Like Tapline, just 30 years before, the project roused excitement and pride in the men involved. Saleh Redaini, for example, the senior project engineer and now manager of LIDD, saw the job as memorable and exciting – and, again, innovative. 'It was very exciting. Going across Saudi Arabia we had to drill our own wells for water supplies and build our own roads for transportation, especially in the west. The electronic survey work was unique and the pipeline design too had many unique features, such as automatic welding.'

Compared to the construction of Tapline, laying the NGL line was a highly sophisticated operation. Instead of having to wrestle the pipes into the trenches by hand, for example, Aramco, this time, strung two 39-feet lengths of pipe (12 meters) over the trench with mechanical sidebooms, and joined them, still suspended in the air, with automatic welders, one moving through the pipe, the other moving along it. Altogether, it took 45,000 welds to seal the 295,000 tons of the 26-28-and 30-inch steel pipe (66-71 and 76 centimeters) used in the project. The NGL line, in fact, was one of the first major pipelines to be built using totally automatic welding techniques.

Work on the NGL line began in November, 1978, when bulldozers first blazed a trail for backhoes to dig a six foot trench (1.8 meters) across the peninsula. About one-third of the trench – some 248 miles (400 kilometers) – had to be blasted through rock – a job requiring 2,000 tons of explosives, but it had little effect on the tight schedule. On July 28, 1980, the final section was lowered into place in 'Gunsight Pass,'



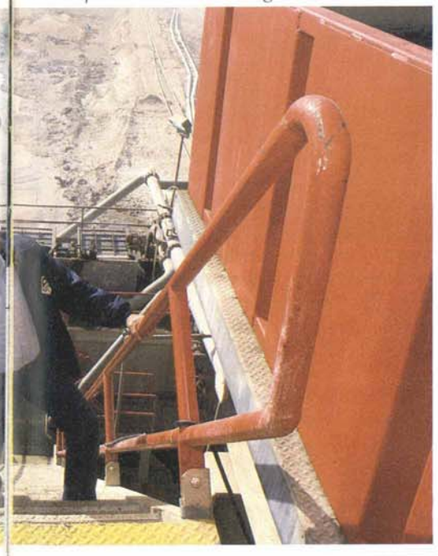
"Aramco, Aramco, Aramco," wrote Hashem al-Awami when asked to list the companies he would like to work for. "You can't find the same benefits anywhere else in the kingdom," says al-Awami, a chemical engineer at Aramco's giant wet crude-handling plant at Safaniya.



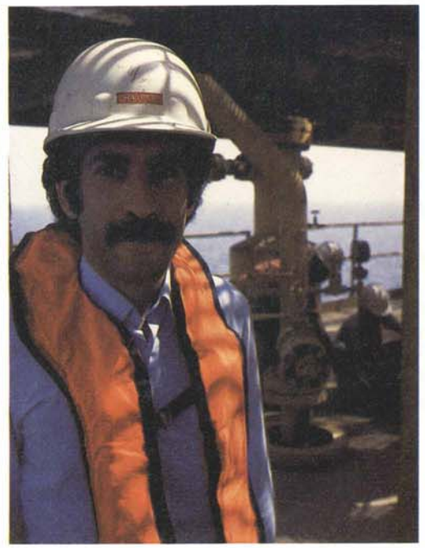
"When I first go aboard . . . (captains) are nervous," says Mohammed Yones, who looks too young to be a harbor pilot – but his proficiency soon quiets their fears.



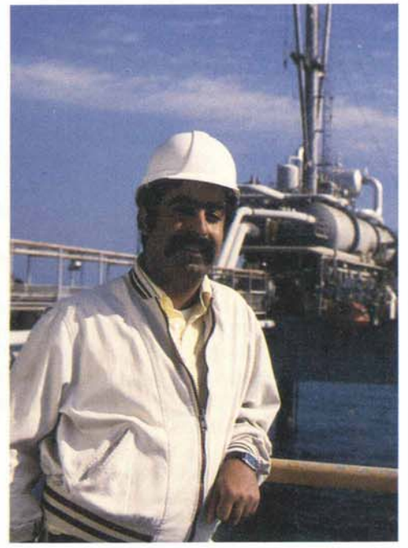
"Petroleum engineers have a good future in Saudi Arabia," says Abdullatif al-Arfaj, seen here inspecting a drilling rig at a gas development well near Shedgum.



"Aramco is moving fast, but not too fast," says Khaled al-Nafisee, who in seven years went from a chemical engineer with just four years work experience to manager of Aramco's Terminal Operations Department at Ras Tanura – the world's largest and busiest oil port.



"Hassling with nearly half of Saudi Arabia's production," is how Haidar al-Awami describes his job at Safaniya – the world's largest offshore oilfield.



"Some Saudi has to do the job; we don't want to be spoonfed by expatriates," says Salim Abu Khamsin, superintendent of Safaniya Offshore Producing Division.

# Naimi:
# "I hope to tell him 'objective accomplished'."

INTERVIEWED BY JOHN LAWTON

*"In many ways, Naimi's story is Saudi Arabia's as well," wrote* Los Angeles Times *staff writer David Lamb on the appointment of 'Ali Naimi as the first Saudi President of Aramco. It is the story, Lamb went on, of a "people and a country transformed by oil."*

*"In a single generation," he said, "Naimi has seen the transition from a nomadic to an industrial way of life and in the process has himself become a symbol of what educated, intelligent Saudis today can and do achieve."*

*The story, as told by Naimi himself, in an interview with* Aramco World *earlier this year, begins in 1936, the year that Aramco's discovery well – Dammam No. 7 – was spudded in. "I was born just north of al-Khobar. The Bedouin custom then was that when a woman was pregnant she returned to her family, gave birth, convalesced a little and then returned to her husband. But my mother was divorced just before I was born, so instead of going back to my father in Bahrain, I spent the first eight years of my life with my mother's tribe, the Ajmi. We roamed primarily between al-Hasa and Kuwait. One assignment I had as a little boy was taking care of the baby sheep. One instruction that was very specific – that should never be violated – was that you should always stay in sight-contact with the home tent.*

*"I met my father for the first time when I was eight-years-old. His family was involved in the pearling industry in Bahrain; they owned their own dhows and went out after them [pearls]. But when the Japanese came out with the cultured pearl, the industry collapsed and my father came back in 1941 to settle in the Eastern Province.*

*"Some time in 1944-45, an elder brother, who was working with Aramco, said 'Why don't you come along with me and go to the Aramco school? There are no requirements and you don't even have to work for the company.' It was very impressive. I saw this teacher, he had a huge red beard – he must have been Irish – I walked in and enrolled. No one asked any questions. I did that for two years, then my brother died. I was about 11 [but] I took over his job as office boy. In 1947, the government passed a law which said no one below 18 was allowed to work, so I got terminated.*

*"Not long after, I reapplied for work. I told them, 'I may look young, but really I'm 20.' They said, 'we'll give you a chance; go to the doctor and if he says you are 17 we will hire you.' The doctor examined me and said I was about 12. I told him a sad story – I was responsible for my family – and said I was short because I was a Bedu, and he wrote down '17'. I needed the income – not like young people today. This generation is different from mine. We really had to eke out a living. My children won't have to worry about that. I was rehired as a junior clerk, in personnel. I got so interested in typing, I used to type in my dreams. I became very successful. I was one of the fastest – I could get up to 100 words per minute. I also learned shorthand.*

*"The turning point in my career was 1953. I was sent on a summer program to AUB [the American University of Beirut]. There were 20 of us, and the top 10 would be candidates for a scholarship at Aleppo College at Syria. I was very much looking forward to that scholarship, but there*

*was one exam I couldn't pass: the height exam. [At AUB], I was exposed to science . . . algebra and physics [and] liked what I was exposed to. As soon as I came back I expressed a wish to change departments. I didn't want to continue as a personnel counselor. I didn't like the job, because I used to type out and distribute the reprimands which usually meant a deduction from salary. I was the bearer of bad news.*

*"I went to talk to the people in exploration. The assistant general manager asked me, 'Why are you interested in geology? It's very demanding work, it's not clean!' I told him facetiously, 'I want to be president of the company' [Many Aramco executives were geologists]. He looked at me and said, 'Well, that's as good a reason as any,' and so I was assigned to an exploration rig in the northern Empty Quarter as assistant to a geologist. I collected samples and cleaned them. He showed me how to use a microscope. It was interesting work, it was out of doors, and I got very friendly with the roughnecks and drillers. I used to type their letters – I helped them; they helped me.*

*"The company put me in full-time school for two years from 53 to 56. In 56, my advisor called me in and said, 'How would you like to go to Lebanon? You are one of five picked to attend IC (International College) in Beirut, and if you do well you will be sent to the university.' I finished high school at IC in 57 and went to AUB for two years. In 59 I transferred to the U.S. because there was no geology department at AUB. In 62, I graduated with a B.S. in geology from Lehigh [University]. I came back [to Saudi Arabia] just long enough to get married, then returned to Stanford, where I got a master's in geology.*

*"I then came back for work experience – 63 to 67 – with the Exploration Department. I did one year in public relations and three months in the Economics Department, then I told them, 'I would really like to go back to the oil business.' They said, 'okay' – but I had to start again at the very beginning. I went to the Abqaiq 'oil patch,' worked as a foreman and in 69 was promoted to superintendent; 72 to assistant manager of Southern Area Producing, and in 73 to manager. A year later, I assumed the managership of Northern Area Producing.*

*"In 75, I was elected an officer of the company – vice president of Producing and Water Injection – then at the end of 76, vice president, Industrial Relations. In the summer of 77, I was asked to head our office in The Hague for several months. Then, I was acting general manager of Power Systems in the absence of the vice president, then vice president, Material and Supply, and in July 78 was designated as senior vice president. In July 80, I became a board member and in March 82 was designated executive vice president for operations. On January 1, this year, president."*

*In another interview, Naimi also referred back to the man in exploration who had asked him why he was interested in geology. "I believe the man I said that to [about wishing to be president of the company] is still alive. I hope to get hold of his address and tell him: 'objective accomplished'."*



3,550 feet (1.082 meters) up in the Hijaz Mountains.

By 1982, Aramco had also finished the crucial elements of the Master Gas System.

In my day, when you flew into Dhahran, you always knew when you got to the Eastern Province, especially at night, because you could see the gas flares: great flaming torches. We had to burn the gas off then; you couldn't process crude oil if you didn't, and it was ruinously expensive to remove it because there just wasn't a market for it. So we, like every other oil company in the world, flared it off. Before I left, however, those torches were going out as the various components of the Master Gas System were finished one by one.

Launched in 1975 and nurtured by King Fahd, then crown prince, since its inception, the gas-gathering project consists of various plants to separate the associated gas from the crude oil in Aramco's fields and process it so that it can be used as fuel for local industry, as feedstock for petrochemical plants and as NGL – natural gas liquids – primarily for export. It is projected that, by the end of this decade, the Master Gas System will have the capacity to collect

*Section graph of northern offshore area.*

and process more than 4.5 billion cubic feet (125 million cubic metres) of gas a day. With the primary components of the system already in place and operating, the Master Gas System is an extraordinary achievement. The minister of petroleum and mineral resources made that clear as early as October 1977, when the Berri plant – forerunner of the massive gas plants in Shedgum and Uthmaniyah – was officially opened by King Khalid. Minister Yamani said: 'The significance of these plants lies in the fact that they, firstly, magnify and reflect the world's highest levels of advanced technology; secondly, they preserve a great wealth that has long been wasted; and thirdly, they constitute a vital base for the industrialization of our country.'

Today, the gas system is powering 12 electric generating stations – source of most Eastern Province electricity and supplying fuel or feedstock to several huge water desalination plants, a glass bottle factory and lime plant, cement and fertilizer plants, refineries and petrochemical works. The system, still expanding into offshore oil fields, today has the capacity to provide 2.5 billion standard cubic feet (70 million cubic meters) per day of sweet fuel gas; 370 million cubic feet of ethane (13 million cubic meters) and more than 750,000 barrels of natural gas liquids.

In the early 1970's, eventual total control of Aramco by Saudi Arabia was a foregone conclusion. Indeed, most countries of the Middle East, in resuming control of their own destinies, had already begun to nationalize, or otherwise take charge of the petroleum industries within their borders. Saudi Arabia, however, was on record as considering Aramco a 'national asset' – and meant it. The Saudi government, therefore, opted for precisely the same methods that had worked successfully since the day Lloyd Hamilton sat down with Abdullah Sulaiman in 1933: negotiation. As one example, the government *bought* Aramco's bulk fuel plant in Jiddah, and, later, the company's local marketing system. Achieving participation, nevertheless turned out to be an immensely complicated task – Saudi Arabia, for example, wanted control, but did not want to lose the U.S. companies' invaluable expertise and skilled management. Effective January 1, 1973, however, the kingdom acquired a 25 percent participation interest in Aramco, increased it to 60 percent, effective January 1, 1974 and to 100 percent on April 15, 1980, with retroactive financial effect to January 1, 1976.

Simultaneously, Saudi Arabs were taking the hands-on-the-throttle control that my contracts friend mentioned. By 1984, the Saudi work force totalled 34,226 of which 3,343 held supervisory jobs – nearly 62 per cent of the supervisory jobs available.

This, as I keep saying, is the result of nearly 50 years of schooling, training and education – as well as the drive, determination and talent of individual Saudis. But, says Abdulaziz M. al-Hokail, senior vice-president Industrial Relations, it's worth it. 'Developing people is time consuming and expensive, but it pays off in the long run – both from the individual's and the country's point of view.'

Even if some employees leave Aramco after training, al-Hokail goes on, 'they are stars that shine in any company they go to. If you have been working with Aramco you are *recognized*. We have discipline and experience.'

Today, says al-Hokail, 'Aramco has 18 training centers in Dhahran, Ras Tanura, Abqaiq, Hofuf, Udhailiyah and Safaniya [and] 'over 15,000 Saudis come and go through these . . . facilities spending from two to eight hours a day. The programs are directed mainly at students who come to us with nine years schooling or more. Depending on their ability, they are routed to maintenance, operations or clerical positions.'

'Those [new employees] with high school diplomas continue their education and go to university or colleges. Currently we have some 1,400 in universities both in and out of the kingdom, specializing mainly in petroleum and chemical engineering, geology, computer sciences and some finance. We also send people for occasional "topping-up" training to bring them up-to-date.'

'In 1983 we recruited 3,600 Saudis – 1,400 high school graduates and the rest with nine years schooling or more. We try to be very selective in hiring. We have to be cautious because we are working in oil, which is the backbone of the economy. This is why we have this training program. We have the facilities, we have the resources,

but we have to be careful not to over-hire or over train.'

Training does not stop at any particular level. Aramco even has a fast track training programs for young executives – as Khaled al-Nafisee is quick to describe and applaud.

'Because we are a relatively young industrial country we will depend a lot on the young. There *is* a danger in pushing people too fast, but all industry around the world depends on new thinking. Look at the computer industry – most of the executives are in their thirties.'

Himself in his 30's, al-Nafisee is one of a new generation of young Saudi executives assuming highly responsible positions in Aramco – fast. Seven years ago, when he joined the company, al-Nafisee was a chemical engineer with just four years work experience in design – two at a government factory in al-Kharj, and two with an engineering company in California. Today, he is terminal operations manager of the largest and busiest oil port in the world.

'I sure moved fast. I went through engineering (gas refrigeration plant) and maintenance (piers division) and made it to operations superintendent (NGL terminal) in three years. I then went on developmental assignment (oil terminal division) and made it to manager in another three.'

'It was hectic,' he said, adding that there *is* a limit. The company has to know *who* to push. Aramco is moving fast, but not too fast.'

Aramco *is* moving fast in employee development, agreed Nasir M. al-Ajmi, senior vice president of the Operations Service Organization. 'I would rank Aramco among the top companies with respect to management development,' he said. 'We are developing Saudis at full speed today.'

Al-Ajmi himself – today in charge of the support services that keep the giant Aramco operation going – is a an example of how Saudia Arabs have developed in Aramco.

'I was born in a traditional black Bedouin tent not far from what is now the town of 'Udhailiyah. We didn't call it a "tent"; to us it was a house. My father joined Aramco in 1947 as a laborer in the construction department, and in the summer of 48 we came to the Dhahran hills. I was about 11 years old, we had no sheep or camels with us [to take care of] so I started looking around for something to do. I saw lots of kids working and going to school – they even *paid* you to go to school. I had no concept of what education was at that time. We learned by doing – when we were two or three years old we started doing chores, and our parents taught us things no school ever could like character and standards.

'I didn't want to go to school, I wanted to work. I went to al-Khobar to get my documents. They threw me out because I was too young to get a certificate saying I was 18 years old (the minimum working age). So we went to Hofuf where they issued them without pictures and I got one there.

'I didn't intend to stay with the company–just work six months, get some money and go back to the desert. But they moved me to the Abqaiq garage and sent me to mechanics school. I began to have a desire to learn. I went to school in my own time and then switched to school full time. I was sent to the International College in Beirut and later earned a degree in business management at Milton College in Wisconsin. I am still going to school. I just came back from a 13-week advanced management program at Harvard.'

Such opportunities are still available today. Mohammed Yones, for instance, looks too young to be piloting a supertanker but he is, nonetheless, a harbor pilot at Ras Tanura. 'Captains look at me when I first go aboard and I can see some of them are nervous about handing their ship over to me," he says, cheerfully admitting that he is only 29.

Yones began his merchant navy career in 1975 with the Arab Maritime Petroleum Transport Company.

In 1980, after several months aboard a VLCC – very large crude oil carrier – Yones joined Aramco. 'I was the first Saudi with a ticket (merchant navy officer's certificate) to join Aramco.' And in 1982, after six months at Ju'aymah and one-and-a-half years at Ras Tanura, he became a fully qualified pilot.

Today, Yones is one of 34 Aramco pilots – half of them Saudis – responsible for berthing some 300 oil tankers a month at Ras Tanura. The largest tanker he has handled so far was 553,000 tons, one of the largest such vessels afloat.

Another young newcomer to Aramco is Haider al-Awami, a Saudi petroleum engineer who describes his job – production supervisor at Safaniya – as 'hassling with nearly half of Saudi Arabia's production.' It's only a slight exaggeration. In early 1984, Safaniya, the largest offshore oil field in the world, was producing a significant proportion of Saudi Arabia's total output.

Because Safaniya came on stream in 1957 al-Awami must also grapple with production problems associated with what are called 'maturing' oil fields: water encroachment, falling pressure, and salt contamination. 'The time when you just drilled a hole and produced oil is gone in Saudi Arabia. It's much more complicated today. Reser-

*Dhahran today.*



# Kelberer: "Aramco ... lives up to the tall tale ... The reputation was built on facts."

INTERVIEWED BY DICK HOBSON

*"When we first joined Tapline," says John Kelberer, "our intention was to stay for just two or three years . . . We had no intention of raising a family abroad, but the work was always interesting . . . the challenges kept coming . . ."*

*For Kelberer – who joined Tapline in 1950 and has been chairman of the Aramco board since 1978 – the challenges are still coming. As he put it, "both Aramco and Tapline deserve their reputations for being able to accomplish difficult objectives. Both companies have long been pervaded by a 'can-do' attitude. No matter how large or how tough a project was, the attitude was always that we could figure out some way to get it done. Aramco, in other words, lives up to the tall tale. The reputation was built on facts. I can think back to the early days of Aramco and Tapline and recall the absolutely phenomenal obstacles that were overcome, primarily through ingenuity and hard work . . . Those same challenges in different forms continue."*

*One example, he said, was the Master Gas program. "From the outset, many people were advising Aramco that the program was not feasible, that there were too many complications associated with design, construction . . . manpower, materials and supplies, inland transportation, overall logistics . . . It could not be done, they said, in less than 10 to 15 years. We all heard these comments and we did it anyway, in considerably less than 10 years."*

*Since Aramco's 50th anniversary has been described as a time of transition, we asked Kelberer to comment on what's changing . . . He responded: "It is primarily that the* rate *of change is accelerating . . ."*

*Kelberer, obviously, is in a position to judge the rate of change. Like Aramco's early pioneers, he, his wife Arlene, his son, and most of his six daughters saw Arabia before modernization began to change everything – "we were the second family assigned to Qaisumah – [a Tapline pump station]; there were two women and 800 bachelors."*

*"My wife, arriving in February 1951 was not exposed initially to the shock of summer, but she was exposed to about 40 days of the worst* shamal *– sandstorm – I've ever seen. I can remember putting damp cloths over six week-old Mike's face to try to filter out the dust – inside the house."*

*Tapline, obviously, played a large part in Kelberer's life – as well in the Aramco story.*

*"When, in 1950, the first tankers took on crude from Tapline at Sidon, Lebanon, the pipeline was bringing about half of Aramco's total oil production to the Mediterranean, so the significance of the line to Saudi Arabia and Aramco was immense. Unfortunately, Tapline had to cross four countries – Saudi Arabia, Jordan, Syria and Lebanon – which sometimes made it difficult . . . Further complications came after the 1967 war, and finally, it became almost intolerable . . . we were unable to freely operate the line. The Tapline facilities in Lebanon and Syria were officially abandoned at the beginning of this year. At the moment, Tapline's sole purpose is to supply crude oil to Jordan. It was quite traumatic to have been one of those who originally helped to establish Tapline and then, as chairman of Aramco, to have been responsible for shutting it down."*

*In 1971, Frank Jungers, then president, invited Kelberer to join Aramco and – after considerable soul-searching – he went to Aramco as acting general manager, Government Affairs, where he immediately began to rise.*

*"Things moved fast after I arrived in Dhahran. After about a year in Government Affairs, I went through a series of assignments in operations, materials supply, law and finance in preparation for my going to New York as liaison to a study group from the U.S. participating companies and as general manager, Oil and Materials Supply. I returned to Dhahran in April 1974 as a vice-president and director. Late that year I was named senior vice-president, first of Government Relations, then of Finance and Operations." Kelberer went on to become chairman of the Aramco Board of Directors in January 1978.*

*Returning to the subject of transition, Kelberer mentioned "Saudization," the replacement of expatriates, particularly Americans – by Saudi Arabs. "The term Saudization is something we coined in the late 1970's, but it represents a process that has been going on for a very long time, as evidenced by our more senior Saudi officers at Aramco. Essentially all of them have 30 or more years with the company. They began their training in the 1950's.*

*"The rate at which we are accomplishing . . . Saudization has rightfully caused concern among some of our expatriate employees, who might look at this as depriving them of prospects for career advancement at Aramco . . . but our projections to the year 2,000 tell us that a percentage of the divisional managerial and executive jobs at Aramco will require expatriate manpower for some time to come. You have to keep in mind that . . . it takes time to develop experienced employees who understand how a large corporation functions. So there will be career opportunities for highly qualified expatriate professionals for a long time to come."*

*For John Kelberer, one measure of his life in the Middle East is its impact on his children, Michael and Mary Louise, both second-generation Aramcons. Michael, in electronic data processing, is currently on leave of absence from Aramco to earn a master's in business adminstration and Mary Louise, a registered nurse, was involved a few years ago in the establishment of a new intensive care unit in Dhahran. During that period, she met and married an Aramco employee and today lives with three children of her own close to the Kelberer home. And another daughter, Barbara Jean, holds a master's degree in Teaching English as a Foreign Language from the American University of Cairo, where she is now a member of the faculty and last year married a fellow Aramco offspring.*

*Says Kelberer of his children, "They look at Lebanon and Saudi Arabia as home. On the other hand, they have all been raised as Americans and probably feel more strongly toward the U.S. than most children who are born and raised there and take it for granted. The American way of life is not available to the Americans born and raised overseas or, if it is, it is cherished very highly by the local residents. This, of course, does not diminish the fact that my children have a great passion for the countries of the Middle East, where they have grown up. I can say that they are all very good ambassadors on both sides of the ocean – good ambassadors of the U.S. to the Middle East and of the Middle East to the U.S."*

voirs behave independently, and as they get older they get rather crotchety.'

'If it was money I wanted I would go and open a supermarket in al-Khobar. If I wanted a name and prestige I would go into government. I see a challenge in what I am doing here.'

By the 1980's most of the early pioneers had been succeeded by either Saudi Arabs or Americans, in some cases, 'loanees,' men on loan from the U.S. companies.

One example is Bryce A. Blakely from Socal, who now heads Aramco's Facilities Planning Department. In 1970, Blakely was named advisor to Socal's Foreign Operations Staff, a job that included looking after Socal's involvement with Aramco. Then he was promoted to project design manager of the Aramco Gas Program (for Socal) in 1977, and came to Dhahran in 1978 as a Socal project director of Ju'aymah NGL Terminal and Fractionation projects, key ingredients of the Master Gas System.

Blakely, who oversees conceptual planning for all Aramco's new capital facilities, sees a change of pace ahead. 'I feel the company is going through a transition from a booming, growing concern to a more mature operating company.

George Covey, an Aramco veteran who is senior vice-president of Exploration and Producing, has also seen far reaching developments.

An 'oil field child' in the U.S. Covey moved with his family virtually every year to keep up with pipeline construction by Northern Natural Gas, his father's employer. Then, with a B.S. and M.S. in petroleum engineering, he left for Saudi Arabia in 1953.

*King Fahd waves to well-wishers after inaugurating Aramco's Exploration and Petroleum Engineering Center.*

Covey admits that he was 'not really' aware of the important role Aramco had come to play in the kingdom's development until he landed, a bachelor, on Saudi soil. 'In fact, I was somewhat startled with my first look and impressions . . .'

In three decades, of course, things have changed markedly. 'The biggest change has to be size,' say Covey. 'Years ago Aramco was a small company . . . and you knew just about everybody and . . . who to go to to find information. Now Aramco is truly, truly a large company. There is more of a bureaucracy now, more committees. . . .'

But size, he is quick to point out, 'lets you do a lot of things you couldn't do when you were small.' One example is the new Exploration and Petroleum Engineering Center (EXPEC) and the EXPEC Computer Center – facilities inaugurated by King Fahd ibn 'Abd al-'Aziz Al Sa'ud on May 16, 1983. This, he says, is a 'one-of-a-kind facility that puts us right on the leading edge of technology.'

Despite such changes , elements from the early days seem to persist. For example, 36-year-old Roger K. Hadley, manager of lines Department, is too young to be a pioneer, but in our interview seemed to be imbued with the same spirit.

Hadley, who came to Aramco from Texaco in the United States in 1974, managed the world's largest seawater treatment plant – at Qurayyah on the Arabian Gulf shore – before being named to his post in which he now supervises 350 people, all but about a half-dozen of them in the field. His philosophy for success is one which company pioneers also had and which, he says, remains valid today. It's 'knowing how to work and not being afraid to make decisions that are going to have a big effect . . .'

Hadley says that one of the surprises he had when he came to Saudi Arabia to work for Aramco was 'to see how intimately Aramco's growth and the country's growth had been tied together,' a quote that, in its way, sums up the Aramco story: a kingdom and a company growing up together for 50 years.

"This, perhaps, is the unusual feature that has marked the history of Aramco: the slow, peaceful evolution of Aramco from wildcat venture to world prominence, from Americans in tents to Saudi Arabs in the executive suite. I can think of no other examples of such radical, yet peaceful change.

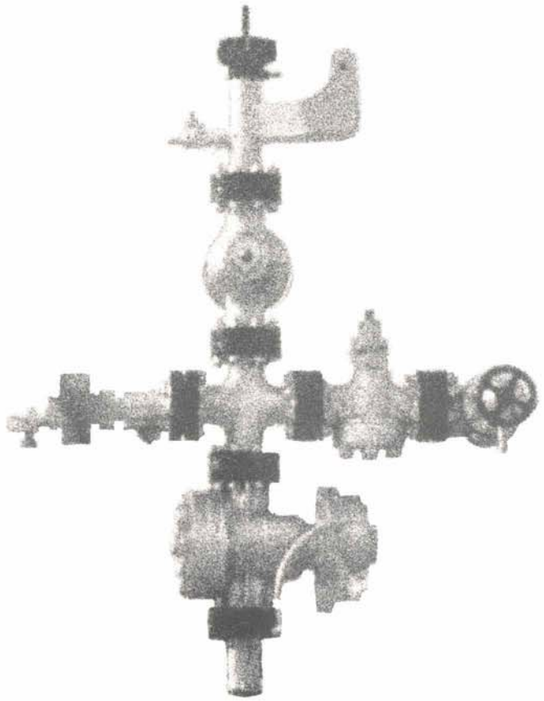
This isn't to say it has been without friction.

But to quote Ali Naimi, Aramco does have a 'long tradition of a successful multinational workforce, working together without the strains or dislocations experienced . . . in other countries.'

Sure, I know that sounds like a PR handout. And so does his reference to Aramco's 'good citizenship,' which has earned the company a 'unique position,' in the kingdom. But it's also true. To quote Wallace Stegner one last time, there was always a 'mythic' quality to Aramco – and today, with other hands on the helm, and other bridges to cross, there still is. I'm proud to have been part of it.'



*Dammam No. 7, Aramco's discovery well, was spudded in December 7, 1936 and blew out December 31, 1937 – without showing oil. Despite this, Max Steineke thought they should keep going and in March 1938, Dammam No. 7 came in – flowing at the rate of 1,585 barrels a day. It continued to flow for 44 years and was still productive in October 1982 when it was shut in after producing a total of 32.5 million barrels – and establishing the oil industry in Saudi Arabia.*



**"Objective accomplished."**

**–Ali Naimi**