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Oil, Urban Development and Planning in the Eastern Province of Saudi Arabia: The Case of the Arab American Oil Company in the 1930's-1970's

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Abstract. The Urbanization of Saudi Arabia owes much of its impetus to the exploitation of its massive oil resources. While oil industrialization has influenced the location and growth of the Kingdom's Eastern Province settlements, it has also boosted intensive urban growth outside the oil producing region. This paper focuses on the impact of oil industrialization, in general, and the Arab American Oil Company, in particular, on modern urbanization, urban development, and the resulting urban planning model. The oil company introduced modern (Western) urban planning in the nascent nation-state traditional society. Yet, it espoused an approach of segregated communities with higher standards for its American employees and less for locals. As such, both the oil company and the fledgling nation-state fell short of devising a genuine planning model suited for a traditional society undergoing rapid development.

Introduction

Oil exploration, production and exporting constituted the backbone of the urbanization of Saudi Arabia. The accompanying socio-political and economic processes of nation building, growth and location primarily determined the shift, organization and distribution of the nation's contemporary spatial network. The operation of these forces was largely affected by the oil economy and political circumstances of the modern nation-state. The scale of urbanization must not be underestimated. For example, Dammam, in the 1930s, was a

small fishing settlement of 1,350 denizens in the east province of the country, which was later chosen by the central government as the regional capital. It had grown to an estimated 20,000 residents by the 1940s, and to a population of 418,500 by 1987; Dhahran was created anew to house the oil company's headquarters in the Eastern Province of Saudi Arabia as well as a US-like suburban residential community, the "Senior Staff" camp, exclusively for its American nationals. Similarly, Alkhobar grew from a mere settlement of fishermen's huts housing 75 people, in 1934, to 20,000 people by the 1940s, and to a bustling commercial port of 132,600 in the early 1980s. More generally, the impact of massive oil revenues, a prerogative income to the central government centered in Riyadh, catapulted the urban growth of the capital which grew from a traditional town of an estimated 8,000 denizens, in 1908, to 27,000 in the 1930s, and to a phenomenal 3.2 million residents in the 1990s [1,2].

In Saudi Arabia, including the oil producing (Eastern) Province, formerly traditional settlements thrived on subsistence agriculture, animal husbandry and trade, while coastal hamlets relied on fishing and pearl diving as their mainstay. On May 29, 1933, the concessions agreement between the improvised, fledging state and the Standard Oil Company of California (Socal), later named the Arab American Oil Company (Aramco), was signed. Following this historic milestone in the history of Saudi Arabia, Socal embarked upon a program of oil related industrial developments that transformed the region's settlements, in particular, and the new nation-state, in general. The millennia spatial system of traditional oases settlements and nomadic dwellers of the desert came to an abrupt turn; the religious towns of Makkah and Madinah were exceptions, for their economies were tied to the religious functions bestowed by Islam. The new conditions have forged a unique model of urban spatial development, which reflects the country's socio-political and economic development and the prevailing international circumstances.

In this paper, I shed light on the factors that instigated the urbanization process in the oil producing Eastern Province of Saudi Arabia, in general, as well as on the urban-related practices by the Arab American Oil Company (Aramco), in particular. I will explore and assess the impact of oil industrialization and Aramco's role in shaping urban development and planning in the hitherto traditional society's urban system. I argue that Aramco's planners encouraged a policy of physical segregation, based on ethnicity and professional grade within its industrial (company) towns and fell short of aiding the nascent government in developing a penuine planning model suited for the local society.

The Saudi setting

Capitalizing on propitious regional and world developments, King Abdulaziz, the founder of modern Saudi Arabia, led a compaign of successful battles and treaties which culminated in the promulgation of Saudi Arabia as an independent nation in November 1932. The period between his capture of the sleepy cases of Riyadh in 1902 and 1932, saw the geographic unification and political consolidation of the new nation-state. The

resulting polity was an absolute monarchy headed by King Abdulaziz and tempered by Islamic religion.

King Abdulaziz inherited a vast, rugged and impassable land thinly populated and isolated from the outside world by forbidden expanse of deserts. In the early 1950s, it was estimated that less than 2 per cent of the entire country was under cultivation [3]. He also inherited a traditional, xenophobic society which was afflicted with poverty, illiteracy, high mortality and endemic water shortages. The new nation lacked modern infrastructure and modern technology was non-existent, while necessary and industrial base was lacking. The country had no social, medical or educational institutions in the modern sense.

Traditional physical forms

Prior to the unification of Saudi Arabia in 1932, the majority of the Arabian Peninsula's settled population inhabited rural settlements abutting scattered oases, on the slopes of the mountains of Asir in the south west, and in the towns of the western coastal region. Traditional Arab-Muslim built environments exhibited several characteristics. They included (1) a considerable degree of autonomy in the running of local affairs, (2) subsistence economies, (3) traditional forms of land ownership treating land as a social resource and marked with spontaneous conversion of undeveloped land, (4) socially informed and environmentally compatible organic growth, (5) self-help and community-supported production of mixed-income houses, and (6) a great degree of the responsibility for providing public services fell on the shoulders of the inhabitants with minimum intervention by the governing body [4].

In traditional built environments, town building was largely the outcome of customary building practices based on an accumulation of locally developed experience and adaptation to local resources. In comparison to modern built environments, land uses were limited, paramountly residential. Endogamy and kinship, rather than land prices sorted inhabitants in the settlement. The limits of animated technology and transportation explained the compactness of built forms and impeded sprawl, a common feature in Saudi Arabia's contemporary forms. Prior to the creation of modern Saudi Arabia, the old system of "town-states" suffered persistent tribal warfare and abject poverty. Concern with security and control over the meager resources (e.g. built area within walled towns) placed a premium on space. Circulation space was minimized, narrow and functionally pro-portionate to pedestrian flow; it was a residual of residential and other built spaces.[1]

The recognition of technological limitations and environmental conditions by the

[1] I emphasize here that my discussion of cultural attributes underlying urban processes may not necessarily be taken as an argument for the application of traditional principles- as they are- to the modern Saudi city. Clear understanding of traditional principles must carefully precede gradual application of pertinent values. They must be tested in light of social desirability and political visibility and their compatibility with the modern technology.

inhabitants and the supremacy of the dictates of Islamic Shari'ah led to striking similarities in Muslim cities. Von Grounbaum noted this similarity alluding to the (1) individually walled quarters, (2) the system of gates on each quarter, (3) the lack of open space in the city, (4) the narrow, meandering streets and alleyways and (5) houses built around courtyards and designed to maximize privacy for its residents. However, Islamic law, derived from the Koran and the Prophet's teachings, permeated the building processes of the traditional Muslim city [5, 6].

At the level of individual buildings, town architecture conformed to Islamically-inspired social norms, which in turn were reflected in the overall patterns of town morphology[2]. For example, fenestration conformed to mutually tacit agreements of respect for privacy between neighbors[3]. In the Holy Koran, Allah says, "Say to the believers that they should lower their gaze and guard their modesty, that will make for greater purity for them, and God is well acquainted with all that they do" (Ch. 24:30). Also, Prophet Mohammed was quoted as saying, "He who looks into a house without the occupants' permission, and they puncture his eye, will have no right to demand a fine or ask for punishment".

In traditional urban forms, internal organization of space reflected climatic concerns, for instance, the presence of a courtyard, and, especially in well-to-do households, internal organization of space was gender-specific as well being ecologically compatible. For example wealthier citizens could afford to build separate courtyards, as well as separate quarters for both females and males. Ecologically, the emphasis was on clustered and attached residential units of non-regular lots fed by tortuous and shaded street networks contributed to a benign macroclimate in the torching, humid summer of the Eastern Province, as opposed to the microclimatic approach in the modern individual villa model and other free-standing buildings using modern technology (e.g. electricity and air-conditioning) leaving large areas of the city prone to adverse weather conditions.

While growth adhered to experience and social norms, physical organization of towns according to a preconceived plan, with distinct uses and a program of implementation, was unknown. No central (e.g. royal) statutes, no large-scale development, no master plans, and no strong legislative controls existed. None of the apparatuses typical of modern urban planning under an established state were developed. The modern modes of transportation and systematic intervention and large-scale urban production under the auspices of a powerful central state seemed, prior to the discovery of oil, beyond reach.

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2 Prophet Mohammed's teachings dealt with the construction of buildings. For example, he stated, "God did not order us to cover stone or clay." Also, Prophet Mohammed prohibited a person from sleeping on an unscreened roof or terrace. A commitment to follow the Prophet's guidance would necessarily imply adding screens to houses roofs, an element which affects facades' configuration. Translation in Hakim (1986), 150.

3 Prophet Mohammed also said, "On the Day of Resurrection lead will be poured in the ears of anyone who eavesdrops on others who dislike him." Source: Hakim (1986),151.

Finally, one could add new land uses such as housing, commercial uses or farmland only after securing the affected parties' rights.

Historical developments and oil explorations

The discovery of oil in Bahrain in 1932 by the Bahrain Petroleum Company, an Anglo-American company, inspired new efforts to try the Saudi soil across the Gulf shores. With unwonted alacrity Abdul-Aziz awarded a sixty-year concession to Standard Oil of California (Socal) to start exploration for oil in the Al Hasa province. An agreement was signed on May 29, 1933. After untoward trials in what seemed a futile effort, in March 1938, SOCAL dug deeper at well number seven, and struck a vast underground reservoir of oil in the vicinity of Dammam, heralding a promising future. However, not until May 1,1939, did oil revenues finally reach an annual share of about 200,000 (UK) pounds in royalties from Socal. Given the fragility of the newly unified nation, the discovery of oil was the *deus ex machnia* that relieved King Abdulaziz's financial impasse.

As oil was struck in 1938, construction work for the industrial infrastructure started immediately and exports began. The admission of American oil companies and further explorations led to the mustering of skilled labor, modern technology, heavy equipment and machinery for oil processing, advanced construction methods, long distance transportation and communication networks, and other supporting facilities. A rudimentary road network and shipping facilities were first laid to facilitate the increasingly expanding oil activities. Commenting on the major oil discoveries in the early 1950s, Ajmi, who worked for Aramco forty years, wrote,

> In addition to expanding oil facilities, major support systems were under construction including housing, roads, power, workshops, communications and transportation. Aramco was undergoing its first, massive expansion program....Aramco hired by the thousands and built permanent and temporary housing for new recruits [8, p. 33].

The placid and bucolic agrarian and pastoral communities of the Eastern Province were gradually transformed into a boisterous hive of oil exporting industry.

The Saudi population first met the new technology with a somber attitude. Change was too fast and dramatic to be comprehended by the traditional society. Nevertheless, Abdulaziz's progressive ideals coupled with rising oil revenues inevitably led to the modernization of both the government and the traditional society. For the discovery of oil in the late 1930s strengthened Abdulaziz's hold over the Kingdom during its formative decades.

In addition, new towns sprouted to house the work force engaged in the new industry. Al-Khobar stands as the first city in the Kingdom ever to start from planned origins[4],

4 With time, and due to their primitive and transitory construction method, old huts disappeared most probably as the government allotted free land to citizens.

while Aththoqba, and Dhahran grew from labor camps and companies' office and residential quarters. Originating from a fort in 1809, Dammam witnessed unprecedented growth as a major commercial port. It was shortly to receive a further boost to its status when the government moved its eastern province headquarters from Hufouf to Dammam. Michael Field noted "It was with these developments, it is generally agreed, that the modern Eastern Province business centers of Dammam, Dhahran and Khobar which was still a collection of *barasti* [structures built of makeshift materials] when the first petrol station was opened there in 1946-began their development as modern cities" [9].

Aramco operations stirred the pre-industrial economy of Saudi Arabia. In 1955, for example, Aramco's direct imports alone accounted for 20 per cent of the contry's total imports of $241,000,000 (compared to national exports of non-oil products valued at $1,000,000), a major increase from the total of $101,000,000 in 1950. Starting in 1946, Aramco contributed to the emergence of modern Saudi local businesses geared toward the needs of the oil company. An Aramco research report in 1957 stated that there were 1145 businesses in Dammam and Al-Khobar [8].

The impact of Aramco's oil operations on the major towns in the region was illustrated in Twitchell's words: "The contrast between the tiny fishing villages of Dammam and Khobar - which I first visited in 1931- where limited gardens provided dates for trading, and the present thriving cities with estimated populations of 20,000 each is almost miraculous" [3, p. 225].

In 1946, the government's receipts from oil revenues did not exceed $10.4 million. Five years following the end of World War II, the government's treasury received a whopping sum of $165 million. By 1953, the year in which he died, the government was receiving over $3 million a week. Revenues from oil continued to grow in leaps and bounds, so by 1957 they exceeded $300 million and in 1965 the national income surpassed $650 million, a fabulous figure when compared to the days of poverty.

Oil towns: genesis and morphology

In the three decades prior to the discovery of oil, Saudi Arabia was undergoing massive political changes which resulted in the stable political environment, a stage which paved the way for signing the concession agreement between the improvished, fledging state and the Standard Oil Company of California (Socal) in 1933. The process of planned communities in Saudi Arabia by Aramco in the 1930s, and by the Saudi government in the early 1940s, constitutes a profound departure from the millennia long practices of urban growth. However, comprehensive, national and urban planning and policy making in the modern, systematic fashion were not used until the 1970s. These planned communities represent direct intervention by the oil industry and the national government to cope with rapid urbanization. The process can be divided into (1) early planned American oil

(company) towns, (2) planned Saudi workers communities in the Eastern Province, and (3) comprehensive master planning in the 1970s.

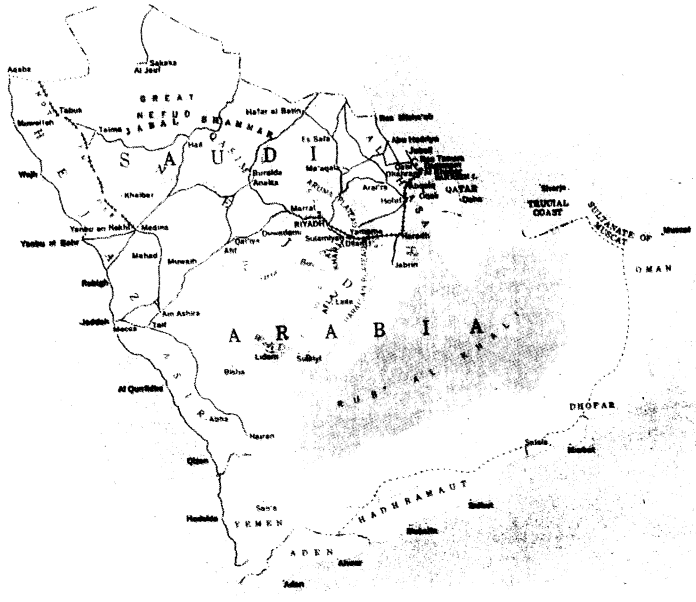
Early planned American oil towns, 1930s-1960s

As oil operations by Socal (Aramco) resumed following the end of World War Two, Socal admitted more Americans and other nationals in the country. Aramco constructed three major settlements at the major oil operations as "outposts of American civilizations"[10]. It built Dhahran anew on a hilly site, twenty kilometers east of the Gulf shores for Aramco's headquarters and to house the majority of Americans. Aramco constructed a second major town, Ras Tannurah, anew on the Gulf coast where a complex of oil processing facilities were concentrated, including a major refinery. Similarily, Abqaiq town was located to serve the great oil field inland. In total, during the 1950s, 6,400 Americans including some with families, were hired in these towns (Fig. 1).

Due to the wide cultural gap between the American-run Aramco and the predominantly rural and nomadic Saudi labor force and American cultural bias, Aramco considered it "practical" to chose a policy of physical segregation.[5] As such, Aramco's company towns and suburban development outside the existing Saudi settlements (Saudi communties), mirrored the oil company's policy of physical segregation according to ethnicity. This segregation also seemed reasonable, if not necessary, to government officials and senior Saudis employed by Aramco, such as Nasser Ajmi, who wrote: "To avoid potential cultural conflicts [sic], Aramco housed employees on the basis of their ethnic, religious and racial origins....Work, housing, eating and recreation were all segregated by nationality and grade" [8, p. 34].

A staff member at Teachers College, Columbia University, Solon T. Kimball was invited by Aramco's Training Department in the summer 1955, to participate in its summer institute for teachers of American children. He published his experience in a paper in which he commented on the nature of urban life in the oil towns. He wrote, "Each town section is divided into five distinctive sections that correspond to internal social divisions or economic functions. Their internal divisions reflected the bureaucratic structure of an American corporation, divisions that are sharply accentuated by the coincidence of status levels and national origins." The rationale of maximizing oil operations was mirrored in the physical and social organization of Aramco town forms, with the ultimate goal of speeding "the flow of oil to an industrial civilization"[10, p.73]. The oil town core comprised the administrative, commercial, operational and service areas. It was located next to the industrial area, a bustling plexus/center of immense oil processing operations, using a labyrinth of pipelines, power connections, and numerous towers needed for refinery, processing and transmission [illegible] array of commercial services and recreational facilities were exclusively geared to the use by the "Senior Staff," a group largely composed

5 The government lack [illegible] ributed to several propositions including its desperate need for oil revenues.



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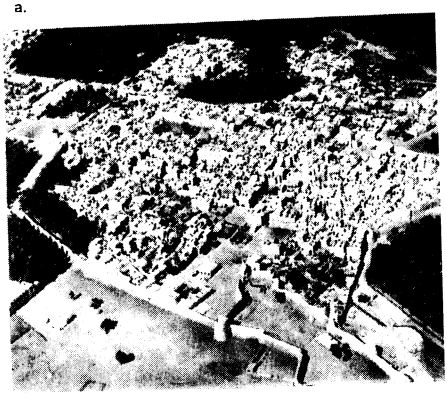


b/c.

Fig. 1. (a) Map of Saudi Arabia showing the East Province's main towns; (b) traditional/pre-oil towns of Qatif which existed in harmony with its surrounding environment of palm trees and limited water resources. Source: [11]; (c) the suq in the traditional town of Hofouf. Source: [11].

of Americans and a handful of other nationals. Kimball viewed the spatial segregation of these communities as a reflection of the wide gap between two contrasting cultures, the Aramco "civilized" Americans living in the "Senior" planned communities, and the backward Saudi labor force confined to shantytowns with their families.

In addition to the core of operations, there were four other sections, assigned for residential uses. The first was the "Senior staff." It resembled an American southwestern tradition of planning. In Dhahran's Senior section, the residential units were single-family, one-story dwellings built of wood and stucco with sloping roofs, each home surrounded by a lawn and yard and enclosed by a hedge. All units were air-conditioned and adequately furnished. Dhahran's layout was a combination of gridiron style, curving streets and cul-de-sacs, and irregular blocks. Streets and walkways were paved, curbed and lighted, and all serviced with the required community services, recreational facilities and a controlled access to the camp. The recreational areas possessed an auditorium, a luxurious club, that included bowling alleys, library and dining area and a terrace for outdoor social functions. Other towns included recreational areas that had baseball diamonds, tennis courts, soccer and football fields and golf links [10].

The "senior staff" housing units varied in style and size. The higher officials in the upper echelon of Aramco's bureaucracy occupied larger, elaborate and better equipped houses. Lower-rank American employees lived in more modest ones. The higher-income single employees were housed in multi-roomed modern buildings with communal space for cooking and entertaining. Other "bachelors" were confined to barrack-type dormitories which contained many conveniences. The American residential camps included elementary and junior-high schools, a hospital in Dhahran and medical clinics in Ras Tannurah and Abqaiq.

As such, the process of Aramco urban planning in the "Senior Staff" communities in Dhahran (and other Aramco planned communities of Ras Tannurah, Abqaiq and Saffanyah) resembles American company town experiments, including a policy of segregation by ethnicity and grade. "By 1940, Dhahran had 95 family cottages and a number of dormitories and bachelor apartments. A commissionary, Store-house, garage and various types of community support facilities including a central air-conditioning plant and utilities were constructed to provide for a fully self-contained family camp" [12, p. v].

Similar but smaller company camps were laid in other oil industrial locations of Ras Tannurah, and Abqaiq. By 1959, the total American population of these towns approximated 4,000 persons, mostly US nationals. Such camps were equipped with community functions deemed necessary to sustain life, all have been built to satisfy short term needs." [12, p. v.] Kimball contends, "No Westerner would have difficulty in identifying the senior staff 'camp' as a settlement built by Americans in our southwestern tradition of town planning" [10, p. 471].

Aramco constructed the second residential area, the "intermediate" camp, for its labor force who were rated primarily "semi-skilled and supervisory." This group was classified as "other nationals", expatriates from Arab, Mediterranean and African countries. They were confined to the barrack-type buildings built of concrete and cement blocks. The "general" camp constituted the third section of the Aramco town. It was inhabited by the Saudi bachelor employees and workers. It was constructed with concrete and cement-block materials, and, like the intermediate section, had modest recreational facilities. Both the "general" and the "intermediate" residential sectors of the city were designed for bachelors.

The fourth section was neither planned "nor welcomed." It was an assemblage of haphazardly scattered residential structures built of makeshift, scrap materials, palm-leaf barastis, and cement blocks. "To the Western eyes it is reminiscent of Hoovervilles of depression days," noted Kimball. As Saudi employees' families were not considered in the construction or planning of early Aramco towns, Saudis found in these shantytowns the only nearby place where they could bring their families. Aramco had left them no choice. Kimball noted,

> Here the employees, mostly Saudis, may bring their families. One can see occasional sheep, goats, and burros, and the camels tethered nearby may belong to an employee or his visiting relatives. One also finds an incipient native suk or market, perhaps a garage and gasoline pump, and other evidences of an emerging indigenous community life. Both Aramco, and the government are disturbed by these settlements, and efforts are under way to encourage their replacements by the development of planned Arab type towns through subsidies and other devices [10, p. 473].

Kimball's paper portrays the physical organization of Aramco's oil towns. It must be made clear, however, that although Aramco did not formally adopt a clear policy of reserving its exclusive "enclaves" (the term is Gary Anderson's), the company's bureaucratic organization and recruitment practices, especially in the early decades, favored mostly, if not only, American employess over other nationals to live in the senior staff communities within its oil company towns. Effectivley, most Saudis continued to live in their home towns or villages surrounding the production fields. However, Aramco which "because of its extensive concessions in the area" could effectively "prohibit development across vast tracts of land," allowed local labor to be housed at Dhahran. But, as Anderson states "as soon as Western families began to arrive, the local camp was moved outside of the main expatriate compound"[1, p. 279].

In the 1950s, Aramco launched its Housing Ownership Program (HOP), as a step to eradicate the glaring gap of spatial differentiation. However, social segregation continued to last for decades to come. Separate planned (or rather platted) communities gradually emerged around the Aramco "enclaves", though, at standards much more modest than those available for the senior staff. These communities were mere annexes, subdivisions which were platted in a rectangular pattern, to allow for the construction of decent houses

for Saudi personnel under Aramco's HOP. Unfortunately, no genuine attempt was taken during the early formative decades by Aramco's architects and planners to incorporate local architecture heritage and planning values in order to introduce new physical environments modified to accommodate modern technology for the Saudi working force.

Instead, the Saudi-Arab worker communities, commonly known as "cities of laborers" were neither designed with respect to traditional values of physical design nor incorporated modern (Western) urban design and planning as illustrated in the fully equipped residential sections built for Aramco's American staff. This tradition of foregoing local cultures architectural heritage and planning values and the laying of open-ended, unconfined gridiron network, lacking the necessary community and recreational services, for the new annexes of existing cities, has characterized subsequent urban development, both in the Eastern Province as well as the remaining parts of the Kingdom. To Aramco's planned Saudi communities we now return.

Planned Arab communities in the Eastern Province, 1930s-1960s

In addition to Aramco's planned oil communities described above which were directly involved in oil operations, oil industrialization spurred tremendous urban development in the surrounding traditional settlements of the Eastern Province. Migrants both from inside and outside the region flocked to the rapidly growing towns in anticipation of job opportunities and better services. Consequently, shanty towns sprang up exhibiting the negative byproducts of intensive, non-planned urban growth.

In 1938, in an effort to solve the problems of overcrowding and encourage planned development in the potentially prosperous oil region, the government allotted free land to settlers in Dammam and Al-Khobar, based on the gridiron system. The land distribution program, the first in the region, granted land to citizens on several conditions including (1) all citizens have the right to request a piece of land to be built according to the prescribed conditions and regulations; (2) no rent should be levied for the first ten years; (3) henceforth, annual rent is to be collected; (4) building activity must be completed before the lapse of a two year period; (5) structures should not exceed one story, those on waterfronts can be higher; and (6) grantees should only use concrete and stone to erect their homes. Until 1939, Al-Khobar's homes were all huts built of palm reeds and trunks, with the exception of one structure constructed of rubble rocks quarried from the sea shore.

The use of concrete structures and cement blocks was introduced in 1950 for the first time in the Eastern Province. Mr. Ahmad Al-K'aki imported skilled builders from Lebanon and Syria to build his big multi-story apartment buildings with commercial spaces on the street level on prospering Khalid Street in Al-Khobar. He hired an Arab architect, Niqulla Salem who introduced the Mediterranean multi-story style to the region. In the new residential units, no space was assigned for livestock for household production, a storage room for dates and foodstuffs, or a water well. Unlike the traditional introverted homes, the new units were adorned with wide windows and doors which opened onto wide, straight streets, all to meet

a.

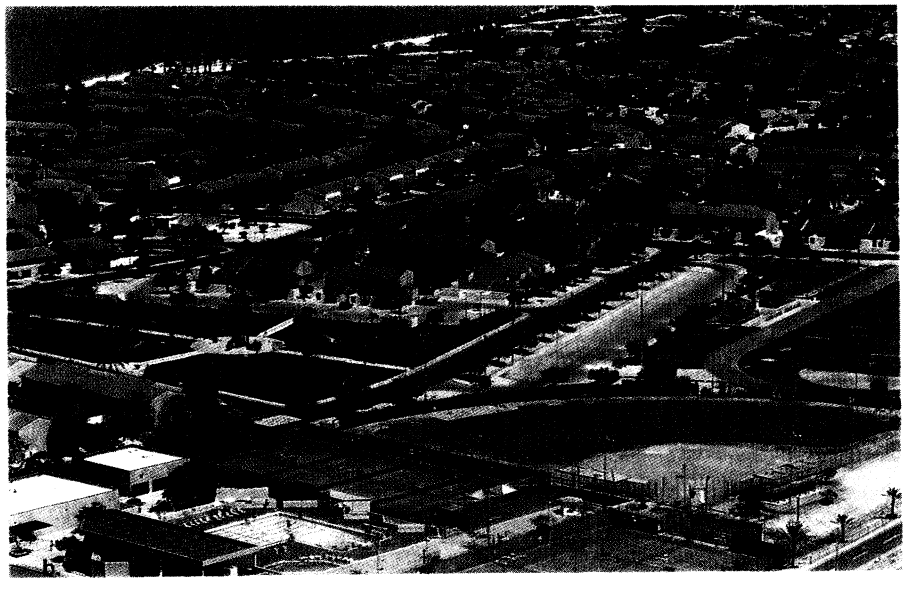


Fig. 2. (a) Aramco planned and construced its "U.S. Suburbia" "Senior Staff" housing in Dhahran and (b) Najmah Camp in Ras Tannurah. Source: [3].

the new building codes of the municipalities (Fig. 2). The architectural style that was opted by Salem was more suited to the Mediterranean region than to the hot and humid climate of the Eastern Province. The new style was to inspire mass emulation [13].

Al-Khobar

In 1935, Al-Khobar was a settlement of fifteen huts. Its pre-oil growth owes to the migration of members of the Dawasir tribe from Bahrain in 1923. Upon their arrival, the Dawasirs settled in Al-Khobar and Dammam where they worked mainly in pearl diving. Prior to the actual exploitation of oil in commercial quantities, Al-Khobar and Dammam's growth was largely governed by its population's natural birth growth. Al-Khobar's status improved when in 1935, a small dock was built by the oil company to facilitate the importation of oil drilling equipment and other materials from Bahrain [13].

In 1947, under the surmounting need to house the Saudi laborers working in the growing oil industry in the country's eastern province, the Governor of the Eastern Province, Saud A. Bin Jiliewy, requested the help of the oil company, Aramco, to prepare a plan for the towns of Dammam and Al-Khobar. The new extensions to the old organically-built towns were laid out in a grid iron pattern for expediency purposes. Al-Khobar was planned according to a gridiron layout comprising rectangular lots of 130 by 200 feet serviced by a north-south oriented road system of various widths ranging from 40 to 60 feet wide. The network was connected to a major road spine adjacent to the waterfront, named Prince Talal street. Under rapid growth, another planned annex was added to the city in 1951, only to be followed by a new extension in 1953. The 1960s and 1970s brought exploding growth to these cities as well as many other Saudi cities. Commenting on the impact of Aramco+s urban planning practices, Al-Hathloul wrote, "As a new community, Al-Khoubar stands out in the history of modern planning in Saudi Arabia; taken as a model for many years, its planning established numerous demonstratabley unfortunate precedents." [5].

Dammam

In the early 1930s, Dammam was a small hamlet of 300 residential huts, nestled on the Arabian Gulf shores. Its population historically thrived on fishing and pearl diving. Now at the locus of the industry, its subsequent growth owes to its location next to the first oil well. Its production of crude oil lured waves of migrants for decades to come. Additionally, several decisions by the Saudi government catapulted Dammam into urban status. In 1950, a new rail road connecting Riyadh, the capital, with the Arabian (Persian) Gulf terminated in Dammam. Another major decree authorized the construction of a new port terminal for commercial uses. In 1952, the central government transferred its regional offices from Hufouf to Dammam.

A fury of building activity soon disrupted the traditional compact form of the town as more migrants settled in the vicinity of the oil company's drilling and exporting operations. Under surmounting growth, the Saudi government sought help in controlling the

layout of the expanding town. Aramco staff picked a large parcel of land outside the old town of Dammam. The company designed and helped in the construction of an adjunct thoroughfare paralleling the shoreline with narrower streets of 70-100 feet branching from the main street to form the major arterials. The interstice blocks were subdivided into rectangular lots of 300 by 600 feet. The 1947 grid-iron land subdivision by Aramco added 400 acres of "planned" area to the organic layout of the city.

By 1950, Dammam's growth was phenomenal and the municipality was forced to extend the gridiron network to accommodate the increasing demand for lots. With the government's aforementioned decisions, a speculative demand for land development resulted in an additional 525 acres of gridiron land. Learning from previous experiment, lot sizes were considerably reduced to dimensions of 150 by 300 feet. In contrast with the traditional built forms, the emphasis on vehicular access resulted in a circulation space of 55% of the total land uses. In a mere few years, 1952- 1957, the area of Dammam tripled from 170 to 925 acres [14].

Aththouqbah

The planning of new, undeveloped tracts of land continued apace with the increasing numbers of immigrants flocking to the oil region. Outside Aramco's Dhahran planning compounds' senior complex, a new working class shanty town, Nehedain, of makeshift structures was built of scrap materials— mud, tin cans, reeds called sarifahs or barastis, and tents grew rapidly lacking potable water, electricity, and sanitation facilities. Its squalid conditions and impoverished population contrasted with the high standards to which Aramco's compound was built, perhaps the major factor which led to its subsequent relocation to a new site, Aththouqbah, five miles away on the road to Al-Khobar. Following several outbreaks of fire and under pressure by the oil company which cited the potential fire hazard to oil installations, the government ordered the relocation of the Nehedain residents to the new town of Aththouqbah. A committee was formed comprising government officials. The members prepared an inventory of the Nehedain's 420 homes. In 1953, the government committee commandeered their property at reasonable compensations plus a thirty percent bonus to help them defray construction costs for their new homes in Aththuqbah where they were allotted free lots [15].

During the 1950s, more new towns were laid anew to house the increasing number of workers enlisted by the oil company. By the mid 1950s, the Aramco employee population reached 20,400 of whom there were 3,000 Americans, 13,400 Saudis, and 3,000 were other nationals. In 1953, Rahima was planned anew to house Aramco workers who worked in Ras Tannurah refineries and loaded crude oil into large tankers. In 1955, the municipality planned the town of Rakkah, a village located between Dammam and Al-Khobar, and in 1956 Othailieah. Several other towns followed suit such as Annuairaiah, Onack and Saihat (1954) and Qatif (1960).

The gridiron system was the common feature in the design of all of these planned communities. Concomitant with the planning of new towns and communities, Aramco introduced its Home Ownership Program (HOP) in 1951 to enable its workers to build their own homes. The plan provided free-interest loans to build on government land. Interest-fee loans were extended for the construction of municipal water and sewage systems. Aramco also provide technical assistance to improve power plants. Such direct aid by Aramco also resulted in a multiplier factor in these towns' urban economies such as the construction sector. The HOP created a prosperous market for locally produced cement, concrete building blocks, and iron grill-work which went into the construction of these houses.

Comprehensive master planning in the 1970s

As the world demand for oil increased in the 1970s, Aramco expanded its operations. Consequently, its company towns witnessed major growth. Anticipating that simple, piecemeal growth of existing company towns components "will inevitably result in conflicting spatial requirements" [12]. Aramco contracted the American planning house of Caudill Rowlett Scott (CRS) to prepare master plans for its towns [11]. CRS made master plans for Dhahran, Ras-Tannurah, Abqaiq, and Saffanyah (Fig. 3). With the expansion of oil operations, Aramco deemed that a comprehensive plan was needed to facilitate future orderly growth. In line with Aramco's instruction, CRS devised the new master plans for Dhahran, Ras Tannurah, Abqaiq and Assafanyah based on the following goals and policies:

- to establish a new image that reflects a contemporary life style
- to encourage people to remain with Aramco through improved community amenities
- to provide permanent facilities equivalent to those available in the United States.
- to plan for segregated communities [16].

The CRS Handbook stated that "Aramco is committed to creating living conditions equal to those at home for American and other non-Saudi employees (Fig. 4). Therefore, the communities and their housing, recreational and community support components will be planned roughly equivalent to those of a middle income California community." "On the other hand," the CRS Handbook reads, "facilities for Saudi Arabians will be planned for the local Arab community on the grade code 23 to 30 bachelor camp." During the 1970s, the Saudi government became increasingly involved in the day to day operation of the oil company. As a result, more Saudis were housed in the Dhaharan senior camp. As such, the ethnic character of the previously American compound was gradually blurred. Yet, it must be noted that Aramco's urban practices left indelible marks on the Eastern Province urban landscape, both positive (e.g. the construction of modern fully equipped, (model) planned communities) and negative (less attentive to local culture urban heritage).

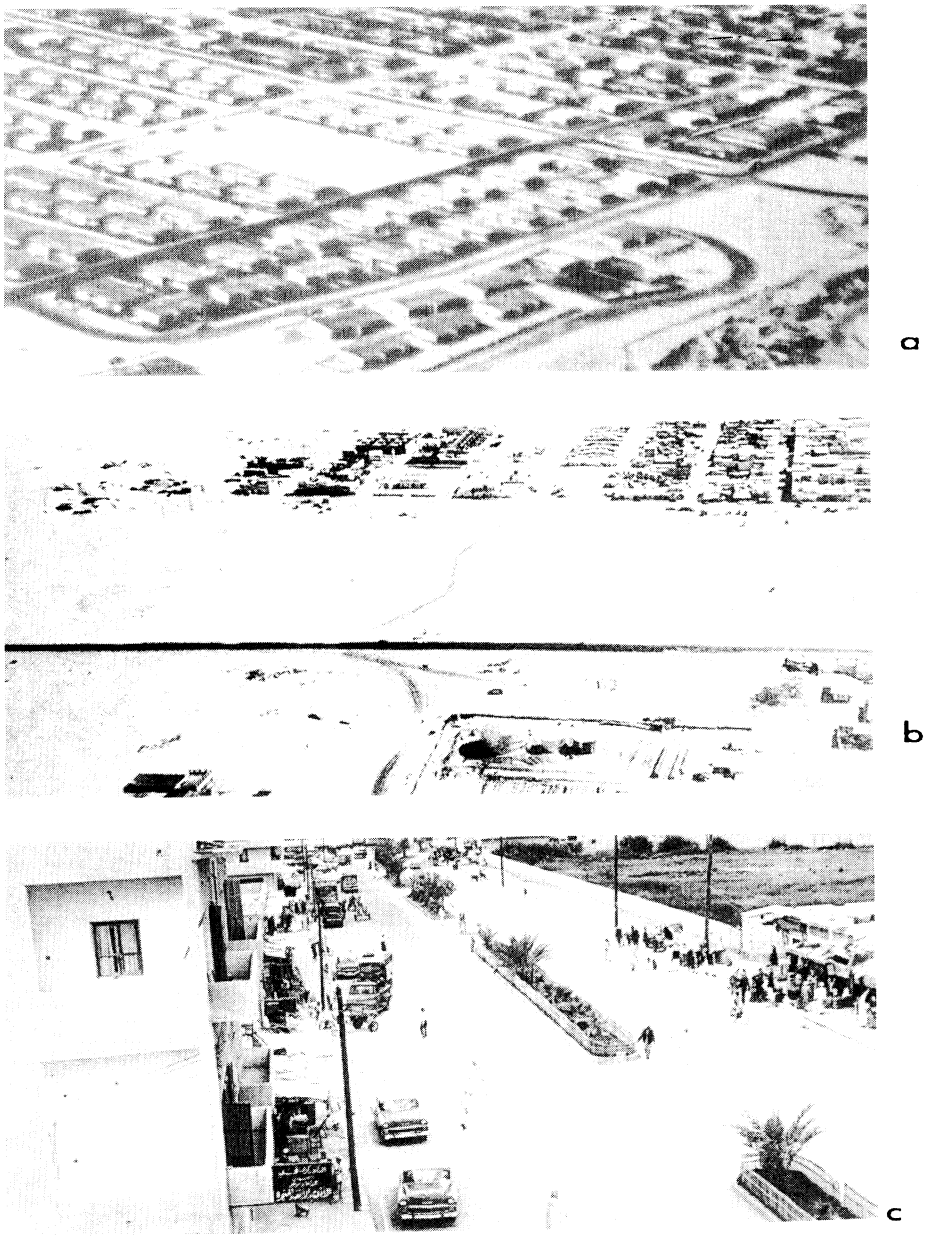
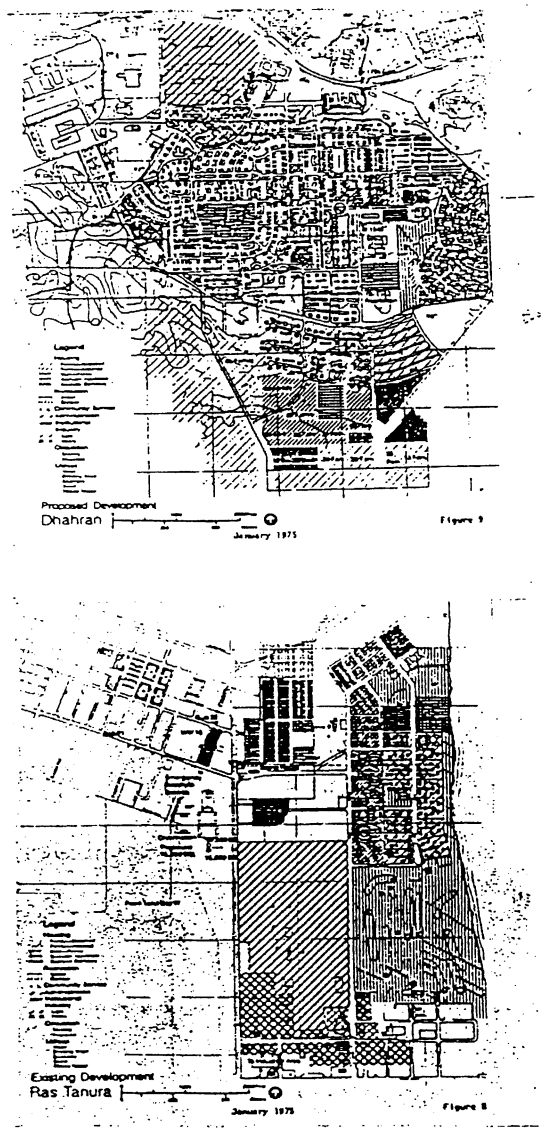


Fig. 3. (a) The oil town of Abqaiq in 1946 started anew from an oil camp to become later the world's largest crude oil processing center; (b) Alkhobar's urban growth follows Aramco's gridiron plan, 1950. Source: [11]; (c) Dammam's main thoroughfare in 1960. Source [8].



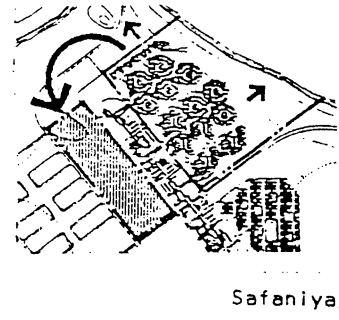


Fig. 4. In anticipation of furthur urban growth in the booming 1970s, Aramco resorted to comprehensive master planning for its oil (company) towns. Source: [12, 16, 17].

Analysis and evaluation

Cultural factors must not be underestimated in the creation of segregated communities. For example, King Abdulaziz demanded that non-Muslims be isolated from the conservative society. Married Saudi personnel even when they reach the "appropriated ranks" chose to live outside the American-centered and exclusively equipped communities. US-planned suburban "Senior Staff" communities seemed strange to eligible Saudis in the early decades of Aramco's contract. Even to the few and newly trained Saudis inching towards higher grade, matching those of their American supervisors, such urban environments seemed "alien," for they lacked familiar urban elements, most importantly mosques. Their visitors had to be screened at the gates, a security procedure which proved to be an alienating practice in a tribal-based society. Also, the imposition of building codes that prevented the construction of adequate fenestrations meant the absence of the privacy element significant to Muslims.

Moreover, the introduction of the Home Ownership Program helped in resolving the problem of permitting Saudis to live with the predominately US Senior Staff residents. In the CRS Handbook (which was prepared in the 1970s) it was noted that, "Although Saudis of the appropriate grade are eligible to live in the family camp, the majority prefer to reside in the local community and take advantage of Aramco's home ownership program." As permanent residents of the country, the HOP encouraged Saudis to live outside the well-planned and serviced company towns.

The traditional Arab-Muslim city organization reflected the emphasis on the privacy of the family and the semi-autonomy of the tribe. Quarters developed were distinguished and personalized reflecting their inhabitants who had a great say in the building of their neighborhoods and the running of their internal affairs. [6] The American-designed city master plans and building codes lack established connection with the religiously-based building processes of the past, namely, concern over privacy and traditions. In addition to the individual "Development Workbooks" for Aramco's four company towns, the CRS also produced a "Development Criteria" manual to guide Aramco's planners in the future expansion of its towns. The planners of CRS stated that "In compiling the criteria, one basic assumption was made, that the development would reflect Western life styles rather than the Middle Eastern way of life in Saudi Arabia" [17].

At the same time, unlike the gridiron, open-ended land subdivisioning of outlying land in the traditional settlements of Dammam, Al-Khobar and the newly laid Aththouqbah, Aramco's "Senior Staff" communities were far better planned and equipped with support facilities similar to those in the United States.

Circumstances, both man-made and spontaneous, which encouraged Saudis to live in less planned "Saudi communities" close to their countrymen outside the privileged "Senior Staff" communities, should not have prevented Aramco's planners from planning Saudi communities fit to their inhabitants. Alas, both the Saudi government and Aramco missed

the opportunity to develop a sound planning approach at the very early stages of the development of the industrial Saudi city.

In brief, Aramco's oil operations have resulted in profound changes on the traditional Saudi society and its settlements+ physical organization. The contemporary metropolis is a result of the pressures of rapid urbanization, reliance on Western models of architecture and planning, the economic peculiarities of oil and the Kingdom's political system.

From the start, Aramco had encouraged a policy of physical segregation in the development of its (company) towns. While it established fully equipped communities for its American staff members, Saudi (Arab) communities grew haphazardly taking the form of shanty towns, during the early decades, and later, under the pressure of the Saudi state, Aramco resorted to the convenient grid-iron platting of outlying land of major non-oil cities and the HOP. As such, Aramco's planners fell short from devising a genuine model of urban planning adapted to the indigenous society.

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صناعة الزيت والتنمية العمرانية والتخطيط العمراني في المنطقة الشرقية من المملكة العربية السعودية
حالة دراسية خاصة، شركة الزيت العربية (أرامكو)، ١٩٣٠ - ١٩٧٠م

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أستاذ مساعد تصميم وتخطيط عمراني، كلية العمارة والتخطيط،
جامعة الملك سعود، الرياض، المملكة العربية السعودية
(قدم للنشر في ١٤١٩/١/١٤ هـ؛ وقبل للنشر في ١٤١٩/١/٢٨هـ)

ملخص البحث. لعبت أنشطة التنقيب وتصنيع الزيت دورا كبيرا في حفز التحضر في المملكة العربية السعودية، فبينما حددت صناعة الزيت مواقع التنمية العمرانية للمستوطنات ونمطها في المنطقة الشرقية من المملكة، فإنها، أيضا، شكلت القوة الدافعة للتنمية العمرانية في بقية المناطق على مستوى المملكة. يناقش البحث تأثير صناعة الزيت بشكل عام ودور شركة الزيت العربية الأمريكية (أرامكو) بشكل خاص على التحضر الحديث في المملكة العربية السعودية والتنمية العمرانية، وتستنبط ملامح التخطيط العمراني لتلك الفترة.

اتسمت منهجية أرامكو في تطبيق تقنيات التخطيط العمراني الحديث التي تم اقتباسها من بيوتات الخبرة العالمية إبان المراحل المبكرة من التحضر السعودي، بالتمييز بين مستويين متباينين في تخطيط المستوطنات التي خصصت للأجانب، مقارنة بالمستوطنات الأخرى للعمالة السعودية والعربية. فبينما نهجت الأسلوب المتكامل في تخطيط مستوطناتها، لم تعر نفس الاهتمام في تخطيط المستوطنات خارج مدنها المتكاملة في الخدمات والمرافق. ويستخلص البحث أن شركة الزيت - ولأسباب تاريخية وثقافية فريدة من نوعها - فوتت فرصة ثمينة لصياغة نموذج تخطيط عمراني في تلك المرحلة التكوينية للمجتمع السعودي.