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DEVELOPMENT OF A TRANSPORTATION SYSTEM IN IRAN

NICHOLAS DON PALADINO

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IN CANDIDACY FOR THE DEGREE
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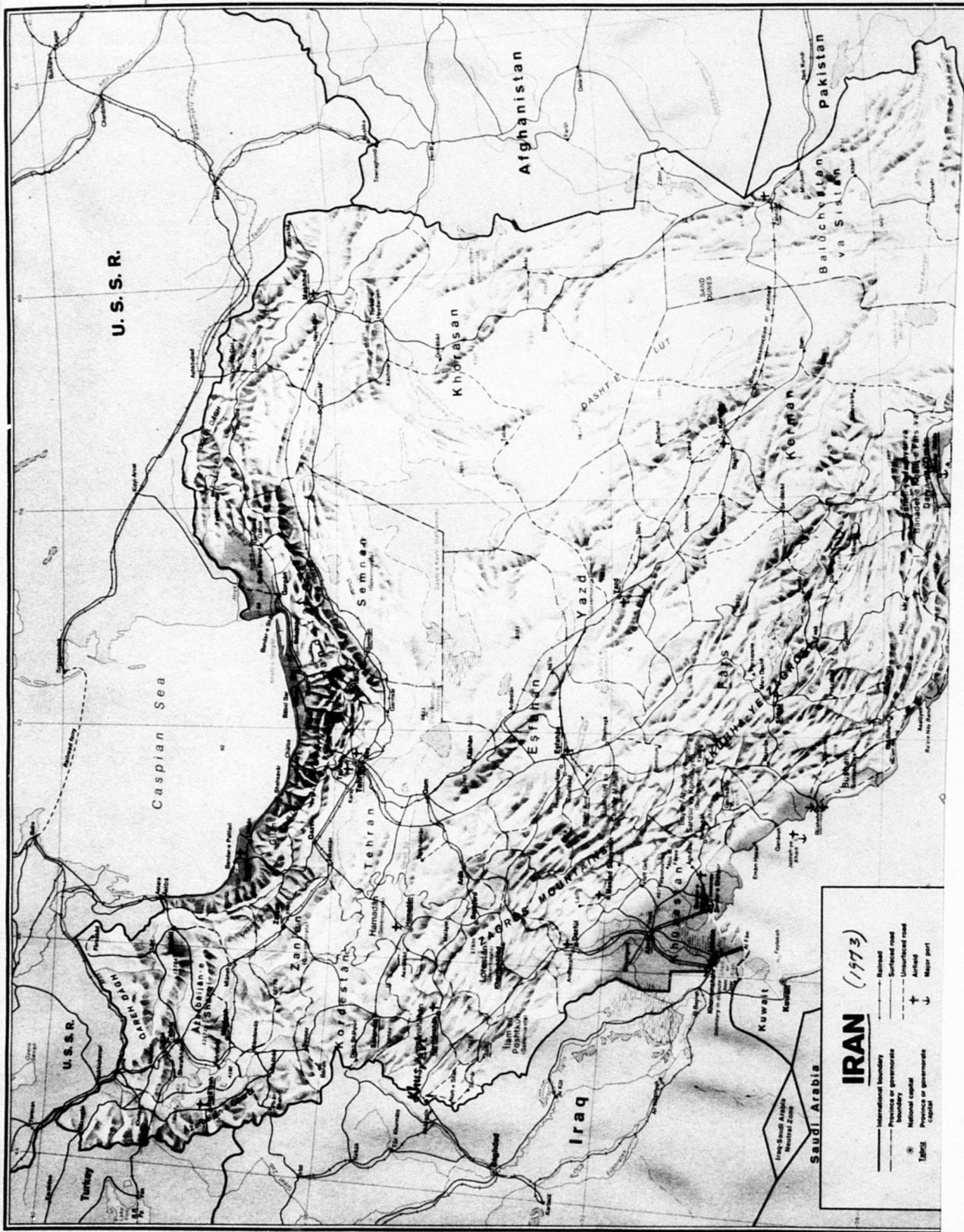
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Chapter I

Iran more than many countries desperately requires a widespread network of rapid communications and transportation facilities. Any central government has always had to strive against the formidable challenges presented by the large expanse of the country and the topography in its attempts to exercise strong effective control throughout the realm and to create an integrated economy. The struggle against geography commences with Iran's area of 628,000 square miles, an area greater than that of Western Europe. An adverse topography consisting of rugged and extensive mountain ranges and large extremely arid regions has tended to fragment Iran into several regions. The mountains have also isolated Iran's coastline, especially that of the Persian Gulf, from the more populous and productive areas. The very factors that have made an adequate transportation system so necessary have also made the construction and maintenance of one extremely difficult.

Iran's general form has been likened to a bowl, with a high outer rim surrounding an irregular and lower, but not low-lying interior.¹ The complex of mountain chains forming the outer rim rises steeply from the Caspian Sea to the north and from the Persian Gulf to the south and equally abruptly from the very flat and extremely low-lying plain of Iraq to the west. In the south and east the mountains are narrower, lower in general height, and more interrupted by lowland basins. In the east the idea of a physiographical "rim" is enforced by the accumulation of sand and rock debris and harsh climatic effects--chiefly aridity with rainfall averaging only five to ten inches a year.

The western portion of the rim is formed by the Zagros mountain

system, the most developed of Iran's mountain ranges. The Zagros mountains consist of a series of high parallel ranges extending from the northwestern corner of Iran in a southeasterly direction along the Iraqi border and the length of the Persian Gulf and comprise the entire western part of the country--approximately one half of the total area.² Throughout the greater portion of this expanse the mountains rise above 5,000 feet and exhibit a marked ruggedness. The major requirement for transportation has been across this series of ranges from the cities along the Persian Gulf and in Iran's portion of the Iraqi plain to the internal cities to the north and on the eastern slopes of the Zagros. The mountains have long been a formidable and effective barrier to transportation between these regions with isolation from the capital being particularly evident.

The Talish and Alburz ranges form the northern rim of the bowl. These two ranges diverge from the Zagros system in northwest Iran and extend eastward just south of the Caspian Sea. Although narrower than the Zagros, they likewise rise above 5,000 feet throughout most of their extent and are quite rugged. These ranges have formed an effective barrier between the Caspian littoral and the remainder of the country.

The interior of the bowl comprises a series of basins lying at altitudes of 1,000 to 4,000 feet above sea level which are drainage sumps for the surrounding mountains. It is a region of intense desert whose extensive areas receive less than five inches of rain a year. Due to this aridity there are no perennial streams; rather the occasional rivers descending from the water scarce mountains simply

disappear into the desert sands. One result of this has been the creation of large salt deposits. These inland basins, which include the lower eastern slopes of the Zagros, cover an area of over 300,000 square miles.³ Thus the central region of Iran is largely a dead region with little population and few transportation routes crossing it.

The availability of water and the harsh topography have spread Iran's population in an uneven manner. The most densely populated region has been the Caspian littoral north of the Alburz and Talish mountains, the region of greatest rainfall in Iran. The highlands of the Zagros mountains in the northwest also support a considerable population. Although this region receives considerably less rainfall than the Caspian zone, the highland basins do serve as natural water reservoirs.⁴ For the country as a whole "precipitation decreases from north to south and from west to east, except where relief of the land upsets the regularity in this arrangement."⁵ Population distribution not unexpectedly has adhered to the same general pattern. Iran's larger cities are widely scattered with several forming an inner arc around the northern, western, and southern edges of the central desert basins. This inner arc is separated from the cities of the west and northwest and of the Caspian littoral by the imposing mountain ranges.

Iran has been further hindered in developing an adequate transportation network by the location of its coastline and the lack of good ports. The country's frontier has been estimated at 2,750 miles in total length with over half being coastline of which 400 miles lie along the southern Caspian shore and the remaining approximately 1,100

miles forming the northern shores of the Persian Gulf and Gulf of Oman.⁶ Unfortunately virtually all of this coastline lies outside of the rim of the Alburz and Zagros Mountains. Of Iran's main productive regions, only the Caspian provinces lie along the coast; all the others are separated from it by the mountains and large stretches of sparsely populated land.⁷ The vagaries of geography also greatly limit the number of true natural harbors, that is well protected bays or inlets which would permit a deep draught vessel to approach close to shore. This lack has meant either that oceangoing vessels would have to anchor off-shore and the cargoes loaded and unloaded in a slow, expensive, and often hazardous lightering operation or that expensive dredging be undertaken and/or docks and jetties be constructed out into deep water.

Iran's Caspian coastline is virtually lacking in good natural harbors due to the shallowness of the sea. The slowly sinking level of the Caspian Sea has been a continuing threat to the usefulness of Iran's Caspian ports. During part of the nineteenth century ships were able to reach Rasht by navigating up a creek from the sea. However, the receding level of the sea later forced the ships to terminate their voyage at Bandar Pahlavi.⁸ Moreover, all of these ports are subject to silting, thereby requiring constant dredging.

Unlike Europe or the United States whose transport development was greatly assisted by many navigable waterways, Iran possesses but a single navigable river, the Karun in the southwest. The river flows westward out of the Zagros mountains and across the plains of Khuzistan and empties into the Shatt al-Arab some forty miles above the head of the Persian Gulf. The river contains a sufficient volume of water to

enable year round navigation; however, the draught of vessels is restricted to but four feet. Moreover, rapids interrupt navigation at the city of Ahvaz 108 miles upstream from the Shatt al-Arab. Beyond the rapids smaller river craft can continue for another 100 miles to Shustar.⁹ More important, though, than the limits to navigation on the river is its location. Being on the western slopes of the Zagros mountains, the Karun is situated in one of the less accessible regions of Iran. Even from Shustar imposing mountain ridges separate the river from the populous and productive northwest and the interior cities.

Due to the remoteness of its ports from the centers of population and production and the lack of navigable rivers, Iran has been forced to rely primarily upon land transport. Without good land routes into the interior even the Karun river could only contribute to regional development. This dependence upon land transport has only begun to be lessened in the past two or three decades with the advent of extensive air transportation.

Notes for Chapter 1

¹W. B. Fisher, "Physical Geography," in The Cambridge History of Iran, Volume I: The Land of Iran, ed. W. B. Fisher (Cambridge: Cambridge University Press, 1968), p. 5.

²Ibid., p. 6.

³Ibid., p. 92.

⁴Peter Avery, Modern Iran (New York: Frederick A. Praeger, 1965), p. 8.

⁵M. H. Gangi, "Climate," in The Cambridge History of Iran, Volume I: The Land of Iran, ed. W. B. Fisher (Cambridge: Cambridge University Press, 1968), p. 234.

⁶Fisher, p. 3.

⁷Charles Issawi, The Economic History of Iran, 1800-1914 (Chicago: University of Chicago Press, 1971), p. 155.

⁸A. Melamid, "Communications, Transport, Retail Trade and Services," in The Cambridge History of Iran, Volume I: The Land of Iran, ed. W. B. Fisher (Cambridge: Cambridge University Press, 1968), p. 554.

⁹Ibid., p. 553.

Chapter II

Several of the Iranian ruling houses recognized the importance of adequate transport facilities for commerce and the exercise of effective political control. Reference is frequently made to the extensive network of roads developed by the Achaemenids and especially to the "Royal Road" which extended some 1,600 miles from Sardis near the Aegean coast through Asia Minor and Mesopotamia, skirting the Tigris River, and thence eastward to the imperial capital at Susa. Intended primarily as an administrative measure, this arterial or trunk road system was carefully controlled and elaborately supervised. It was supported by a series of imperial stations where horses could be changed and messages relayed. In addition to the great administrative roads, another series was built to facilitate the journeys of the royal court amongst its different capitals. A method of road building was developed that consisted of paving the softer parts of the road and even of making artificial ruts for wheeled transport. Although built for imperial management, the roads facilitated caravan trade and increased its volume throughout the empire.¹ The Sasanian monarchs also acquired renown as builders of roads and bridges. Wilson asserts that "long stretches [of Sasanian roads] are to be found in every part of the Zagros range from latitude 36° to Bandar Abbas and beyond and in Gilan, Mazandaran and the Alburz range."²

Between the Islamic conquest and the middle of the nineteenth century the Safavid dynasty seems to have been the most energetic in improving means of transportation. Wheeled transport had long since disappeared when the Safavids rose to power in the early sixteenth century and had been replaced by the more economical camel caravans. The camel

and other pack animals had much less need for broad and well built roads than wheeled vehicles. Across level stretches the caravan routes had become mere tracks, "but in the mountain passes wide, ladder-like steps were cut out of the bare rock."³ Most of the effort in improving communications and trade went into the building of caravanserais and post houses where men could obtain food and lodging, pack animals rested, and official messengers exchange horses. The caravanserais were located at approximately 20 mile intervals, the distance of a day's journey.

Early in the seventeenth century the Safavid Shah Abbas I devoted considerable resources to improving transportation. The shah instituted a better type of road known as the sang-i farsh or "stone carpet" consisting of a stone pavement laid upon a high earthen embankment. One such road was constructed through the Caspian provinces of Gilan and Mazandaran. Shah Abbas also had numerous caravanserais constructed along the major trade routes.

After the collapse of the Safavid dynasty little was done by the government to improve the road system, and roads already built fell into ruins. "Under the Qajars roads and caravanserais were allowed to decay, and when, in the later part of the nineteenth century, trade began to increase, Persia found herself almost unprovided with even tolerably good mule tracks from the Persian Gulf across the Zagros or from the Caspian littoral over the Alburz to the central plateau."⁴

The lack of an adequate transport network greatly contributed to the fragmented nature of Iran's political structure and economy. The shah actually exercised little power beyond the environs of the capital.⁵

Although other factors such as the lack of a significant standing army or a strong bureaucracy severely restricted the strength of the Tehran government, the absence of any rapid means to reach the provinces rendered the exercise of central authority highly tenuous if not in many instances simply impossible. Thus the shah was forced to delegate much of his authority to provincial governors, tribal leaders, and lower authorities. ". . . The Qajars . . . were unable to say much about the day-to-day governance of the provinces, not to mention the large tribal areas that were almost completely beyond their control."⁶

The difficulty of transport and the resultant high cost greatly restricted both foreign trade and internal commerce. The lack of both good harbors and adequate routes into the interior restricted Iran's foreign trade with the result that few cities traded regularly with foreign countries.⁷ Likewise Iran did not possess a national economy; rather the country was a composite of several largely self-sufficient regional economies centered about the major cities. The lack of good internal communications resulted in regions having surpluses in particular goods not being able to conveniently ship them to deficit areas in exchange for goods they may have required. The situation was especially deplorable in the distribution of food stuffs. Writing in the early 1890s George N. Curzon noted the high price of grain in the big cities but elsewhere the waste of crops "arising from the lamentable dearth of transport. At Damghan barley was recently selling for 8 krans (rial) per kharvar, while in Tehran the current price is 50 krans. Meanwhile at Qum and Qasvin the price is 20 and 24 krans, but there are no means of transporting it."⁸ Thus famines occurred in some parts of

the country while at the same time other regions enjoyed food surpluses. The distances and conditions of internal transport further rendered it easier for several regions to trade externally than with other parts of Iran. Thus the northern part of the country more readily traded with Russia than with southwest and southern Iran, and regions in the southern and western Zagros mountains more readily traded with Great Britain through the Persian Gulf.

It was in the latter part of the nineteenth century that renewed interest was shown in Iran's transportation facilities and significant efforts made to improve them. However, the source of this new interest did not originate with the Qajar government, which continued to show a marked lack of concern over improving communications by its own efforts. Rather the impetus for new construction came from various European entrepreneurs and governments, especially Russia and Great Britain, to whom the Qajar government was content to grant concessions for the constructing of roads and railroads. However, the Qajar's freedom to grant these concessions was severely restricted by the imperial rivalry between London and St. Petersburg. Iran had the misfortune of being the arena in which the imperial interests of these two powers clashed. In the latter decades of the nineteenth century Russia was extending its dominion far into Central Asia and attempting to move south of the Caspian Sea. Great Britain perceived this advance as an imminent threat to its dominance of the Persian Gulf and more importantly to India. It therefore moved to counter Russian advances and to enhance its own position. Thus this period witnessed a continuing struggle for political influence

and economic advantage in Iran. This contest had a profound influence not only upon the granting of concessions but even upon the tendering of proposals to the government in Tehran.

Further the proposals advanced and the concessions granted had the best interests of the concessionaire uppermost in priority rather than those of Iran. European businessmen were concerned with maximizing their return on the substantial investments required to complete the projects, and Great Britain and Russia were concerned with economic penetration and strategic position. Any benefits deriving to Iran would be incidental to the attainment of European objectives. Of course there was a measure of commonality between the needs of Iran and the goals of the concessionaires. Roads and railroads could hardly be profitable unless they linked major urban centers to other large cities or to the country's productive regions and facilitated the movement of trade between Iran's points of entry and its interior markets. Thus Iran would benefit to some degree from the various concessions but the balance of advantage would lie with the concessionaire.

The imperial rivalry between St. Petersburg and London had a particularly deleterious impact upon the construction of railroads. Throughout the last half of the nineteenth century and extending to the First World War considerable interest was continuously expressed in various schemes for Iranian railroads. Indeed in 1889 George N. Curzon could write "if the correspondence [on the subject of railways in Persia] that has passed from the various Legations in Tehran to the great capitals of Europe, and more especially to St. Petersburg and London, were collected,

it would provide a bonfire that would blaze for a week."⁹ Yet extremely little resulted from the many discussions and representations to the Shah's government.

The economic uncertainties of railroad construction in Iran and the frequent opposition of the British and Russian governments even to proposals by their own nationals largely accounted for the small amount of railroad construction prior to World War I. Initially railway construction was quite costly, and, even though the terms of the concessions were very lucrative, raising sufficient capital was often extremely difficult especially when the concessionaire did not enjoy the full support of his government. Moreover, many of the proposals, such as those for railways from India to the Mediterranean through Iran, Iraq, and Syria, that were put forward as early as the 1850s were completely uneconomical.¹⁰ European entrepreneurs were undoubtedly more interested in near term profits than in long term development of Iran's economic potential.

Both Great Britain and Russia had distinctly ambivalent attitudes toward railroad construction in Iran with powerful interests presenting arguments both in support of and in opposition to railway development. Commercial interests advocated railways as an easier and thus less costly means of moving goods into Iran's markets. This would enhance either British or Russian economic position in respectively the southern and central regions or the northern regions of Iran. The two governments were also split with the advocates advancing motives of political penetration and strategic advantage to buttress their position. However, the opponents used precisely the same type of arguments to block railway concessions. Essentially the opponents of railroads pointed out that railway construction is a game two can play and that railways run in two

directions. The opponents realized that railway construction by their nationals would most likely provoke construction by the other power to counter or at least balance any advantage gained by the initiator. North-south trans-Iranian lines particularly were a dual threat--any Russian built line that could carry Russian goods and influence south of Tehran toward the Gulf could just as readily carry British goods and influence into the zone of Russian predominance and the reverse was true for British construction northward from the Gulf. In the end the opponents prevailed, and both governments blocked railway construction in Iran in the final years of the nineteenth and early years of the twentieth centuries.

Before the policy of obstruction became well established a few concessions were made by the shah; however, very little construction resulted from any of them. The most famous or rather notorious railroad concession Iran granted was the Reuter Concession. In July 1872 the shah granted to Baron Julius de Reuter a sweeping concession covering most aspects of Iran's economy. The most important part of the concession was the construction of a railway from Enzeli (Bandar Pahlavi) on the Caspian Sea to the Persian Gulf with the right to construct branch lines "either to join together the provinces and towns in the interior of the Empire, or to join the Persian lines with foreign railways at any points on the frontiers in the direction of Europe or of India." The magnitude of the concession astounded Europe and dismayed many Iranians as it appeared that the shah was surrendering the economic resources of his country to a British businessman. Within Iran strong public opposition formed against the gross give-away. Russia mounted intense opposition to this considerable

British advance which would have effectively foreclosed further exploitation by anybody else. However, London did not support the concession partially because it felt the north-south link would jeopardize its own dominance in the Persian Gulf region and bring Russian influence uncomfortably close to India. In the end de Reuter was forced to withdraw from the concession after having prepared but one kilometer of railroad bed.

As part of its response to the Reuter Concession the Russian government encouraged the retired Major General Falkenhagen to apply for a concession for a railway from Julfa on the Irano-Russian border to Tabriz. In 1874 the shah granted the concession but on terms less favorable than those originally proposed. This reduction was due to pressure exerted by London which maintained that the concession was contrary to the Reuter Concession. After some expenditure by the Russian general for surveying, the concession lapsed because he was unable to procure the necessary funds for construction. The Russian government, after internal debate over the matter, decided not to support the concession by providing the required monies.

Until the end of the 1880s both London and St. Petersburg worked to prevent railway construction in Iran. However, their success was not completely absolute. In 1882 the shah granted a concession to the Frenchman M. Boital which included the right to construct a railway from Rasht to Tehran; however, after spending a considerable sum of money, he was unable to fulfill the terms of the concession and lost the "caution money" which he had deposited. Under the Decauville Concession of 1885 six miles of narrow-gauge line was constructed from Tehran to the Shah Abdul Azim shrine in Rey in 1888.

In the late 1880s interest in and competition over further railroad construction again became acute. Yet the denouement of the diplomatic rivalry was the virtual cessation of railway construction for over twenty years. For both political and economic reasons St. Petersburg decided not to support an ambitious project put forward by a group of Russian businessmen and decided instead to work for an agreement with Tehran that would frustrate all railroad construction. On 11 November 1890 Russia secured an agreement with Tehran in which "the Persian Government engages for the space of 10 years . . . neither itself to construct a railway in Persian territory nor to permit nor grant a Concession for the construction of railways to a Company or other persons." Great Britain acquiesced in the agreement because it accorded with its own policy of preventing any threat to the defenses of India. The agreement was renewed in 1900 for a further ten years thereby ending any chances for railroad construction until 1910.¹¹

The elimination of railways required that some other means be found to transport the increasing volume of trade moving into and out of Iran. In the south the British decided to build upon their already existing regular steamer service between Basra and Baghdad and extend its operations to the Karun River. Beginning at least from 1871 various attempts were made to open the Karun to navigation. However, the certainty of Russian opposition to any foreign attempt to acquire a foothold in southern Iran¹² or to establish trade routes into the interior other than through Russian territory and the shah's own concerns over possible British domination of the distant Khuzistan region combined to frustrate the British

proposals. Finally on 30 October 1888 the shah issued a decree opening the Karun River, as far as Ahvaz, to "commercial steamers of all nations, without exception." The Russians of course protested what in their opinion was tantamount to a concession to Great Britain. The British ambassador in St. Petersburg calmly replied that the Karun had been opened to everyone. The Russian representative could only point out that in actual fact only Britain could profit from the route.¹³ Within three years the river above Ahvaz to Shustar was also opened to navigation. Shustar marked the limit of navigation on the river.

This new route definitely increased trade in the southwestern region of Iran. British trade "in the Karun region" rose from £16,000 in 1891 to £272,000 in 1902. The population of Khorramshahr in this period tripled,¹⁴ and the city became the prime port in south-west Iran. Shustar also benefited greatly. The city's population increased, and "it became the major retail center of south-western Iran."¹⁵ The five hundred mile journey from Bushire to Isfahan could now be completed in about half of the month's time previously needed, and freight rates for the trip were reduced.

While Great Britain was exploiting the opportunities afforded it by navigation on the Karun River, Russia was engaged in constructing a road network in northern Iran. "Wheeled vehicles were introduced from Russia as late as the middle of the nineteenth century, and even in the seventies the only road outside Tehran was the one leading to the village district of Shemran, the site of the royal summer residences and the foreign legations."¹⁶ In 1881 a Russian firm obtained a ninety-nine year concession for the construction of a road from Julfa to Tabriz and

the right to charge tolls on vehicles and passengers. The Iranian government's royalty was to be fifty per cent of whatever exceeded twelve per cent of the firm's net profit. The company completed the road within three years with an expenditure in excess of 10,000,000 roubles.¹⁷

It was not until after 1890 that Russia commenced road construction in Iran on a large scale. The decision of the Russian government in February 1890 to forego railroad construction in no way extended to roads. On the contrary, the decision of the critical ministerial meeting specifically mentioned that "to improve Russian trade, the caravan tracks between the cities of northern Persia should be improved to accommodate wheeled traffic, and the ports on the Caspian Sea should be joined to the proposed road system."¹⁸ The main agency for accomplishing these ends was the Insurance and Transport Company of Persia headed by the financier Lazar Poliakov.

In December 1890 Poliakov received a seventy-five year concession giving him a monopoly of insurance and transport business within Iran on extremely lucrative terms. However, a monopoly transportation agency would be of little value as long as Iran remained virtually bereft of roads. In June 1893 a subsidiary of the Insurance and Transport Company acquired a concession to build a carriage road from Enzeli to Qazvin. The term of the concession was ninety-nine years, and the company was entitled to collect tolls from vehicles and passengers. The firm was exempt from taxes and was to pay a fifty percent royalty on any net profits exceeding twelve percent on capital invested. In 1897 the same

firm acquired rights to the road from Qazvin to Tehran which an Iranian had improved and at about the same time also obtained the right to extend the carriage road to Hamadan. The Enzeli to Tehran road would be the shortest route from the Russian road and railway system via the Caspian Sea to Iran's capital, and the extension to Hamadan would facilitate Russian trade into the productive western region of the country.

Construction of the Enzeli-Qazvin section did not commence until 1896. The entire project soon proved to be much more difficult and expensive than initially anticipated. Financial difficulties ensued, and the Russian government finally acquired both the subsidiary company and the Insurance and Transport Company of Persia and completed the project with its funds. The route to Tehran was completed in August 1899 and the extension to Hamadan in 1906. The Enzeli to Tehran road cost in excess of 10,000,000 rubles.

This high cost was due to the high standards to which the road had been built. The Russian Ministry of Finance had warned in 1895 that the road should not be more than two meters wide, arguing that a full-scale route with grading adequate for wheeled vehicles was not economically justified considering the volume of trade to be expected. However, as the Poliakov company had a railway in mind, the warnings were ignored with the result that "the completed road was a superb military highway along which supercilious camels and harried horses continued to plod with their packs. The caravan trek was not a day shorter."¹⁹ However, by post-chaise the trip from Rasht to Tehran could be made within forty-eight hours.²⁰

Evaluations of the success of the Enzeli-Tehran road are somewhat

contradictory. On one hand Entner indicates the tolls were set so high that transportation costs increased 10 percent and that many traders preferred the mountain trail from Mashhad-i Sar to Tehran. Thus the high tolls barely covered the interest on Russia's investment in the road.²¹ On the other hand Melamid asserts "completion of the road immediately changed the economy of Tehran." Trade and manufacturing became increasingly important to the capital as opposed to the court and foreign legislations. "Tabriz lost some of its business to the capital, and traders from this city as well as from Isfahan and other towns began to settle in Tehran and expand its bazaars."²²

In 1902 the Insurance and Transport Company of Persia, which was now controlled by the Russian Ministry of Finance, acquired the Julfa to Tabriz concession and the right to extend the road to Qazvin where it would link with the Enzeli-Tehran road. Using 4,690,000 rubles from the Russian government, the company built an excellent motorable road to Tabriz which was intended to serve as a railway bed and provided a fine connection with Julfa. Although the populace tried to boycott the road and resisted the imposition of tolls, the road proved a success. It showed a profit and shortened the time for caravans to around four days.²³

A final Russian road project was the improvement of the difficult trek from the Caspian port of Astara to Ardabil in the interior of Azerbaijan. In 1888 a Russian-supported Iranian received a concession for the necessary work, but the enterprise failed and reverted to the Iranian government in 1893. Ten years later a Russian entrepreneur received a concession for the route, but he too went bankrupt. The

Russian Ministry of Finance completed this project also. The improved trek provided easier access from the interior of Azerbaijan to the Caspian-Volga route and the Moscow industrial region.²⁴

To the south the British were likewise engaged in road construction so as to extend their commercial penetration into central Iran and northwards towards Tehran. The Imperial Bank of Persia in January 1890 bought a sixty year concession from an Iranian, who had received it the previous year, for the construction of a road from Ahvaz to Tehran and between Burujird and Isfahan. The Tehran government further granted the Bank the right to exclude others from carrying passengers and merchandise by any means of transport over the road. The Ahvaz-Tehran route was to pass through Dizful, Burujird, Sultanabad (Arak), and Qum. The segment from Tehran to Qum was finished in 1891 and the operating firm authorized to charge tolls. In November and December 1898 the government authorized extension of this road to Isfahan.²⁵

In 1902-03 the Persian Transport Company was formed with official British backing to counter an attempt by a rival Russian bank to control the road. The company was authorized to conduct transport and other business on the road and the Karun River as well as continuing construction of the entire route. In 1906 the Qum-Sultanabad portion was finished, and tolls charged here also.²⁶ The Ahvaz to Dizful and Qum to Isfahan segments were finished at a later time leaving only the two segments from Dizful to Sultanabad incomplete due to tribal disorders.²⁷

The Persian Transport Company further agreed with the Bakhtiari Khans to construct a mule track from Ahvaz to Isfahan. Although the

completed route, which was known as the Bakhtiari Trail or the Lynch Road, was considerably shorter than the previous Bushire to Shiraz to Isfahan route and did result in increased traffic, the route did not attain its full potential. The cost of fodder on the route was quite high, and the lack of a single considerable town en route along the approximate 275 miles placed it at a disadvantage with the older route. Moreover "the track was closed by snow for five months in the year, and it was never really suited for camels."²⁸ Finally deterioration of the track was quite serious and caused a sharp drop in camel transport.

Although they dominated by far road construction within Iran, the British and Russians were not alone in this type of endeavor. Shortly prior to World War I an Iranian entrepreneur built a road from Mashhad to the Russian border at Bajgiran where it joined a feeder road from the Trans-Caspian Railway at Ashkhabad. This route facilitated trade with Central Asia. However, a few years later Jamalzadeh noted that the concessionaire had not kept the road up properly.²⁹ Other Iranian businessmen improved the road from Mashhad-i Sar on the Caspian Coast in Mazandaran Province to Tehran.

Although wheeled vehicles were introduced into Iran at about the middle of the nineteenth century, they long remained a very subordinate part of Iran's transport. Wilson estimated that in the years preceding World War I "mules, pack-horses, camels and donkeys carried at least nine-tenths of the imported, and an even larger proportion of local merchandise."³⁰ Motor vehicles were only beginning to appear in these years. One author indicates that the first importation of motor vehicles into Iran occurred in 1909, a few in the capital and a few in the south for

working in connection with the pipelines, production facilities, and refinery for the Anglo-Persian Oil Company.³¹ In 1910 Tehran had but one automobile, that of the ruler Ahmad Shah, and 1912 witnessed the appearance of the first motor car in the streets of Ahvaz. In 1913 one or more cars made the trip from the Persian Gulf to Isfahan and Tehran.³² In this same year "a Russian subject obtained 'the contract for a service of motors till the end of 1919 on the roads from Rasht to Qazvin, and from Qazvin to Tehran, and Qazvin to Hamadan,' and some Peugeot cars were put in service in 1914."³³ Still these were but the smallest of beginnings for motor transport and did virtually nothing to alter the overwhelming dependence upon pack animal transport.

Prior to the First World War there was but one serious effort at port improvement, that by the Russians at Enzeli, Iran's major port on the Caspian. Between 1905 and 1913 Russia expended some 1.3 million rubles in improvements at the port; yet "the results were ludicrous." The vast amount of material carried into the port's lagoon by the Murdab River and winter storms was the main problem. The construction of two moles by Russian engineers only worsened the situation, as the quiet water behind them filled with sand within a few years. A contemplated full-scale project including extensive dredging operations was disrupted by the war. "What had been done up to that time was inadequate, poorly planned, and actually damaging to the effectiveness of the road to Tehran."³⁴

At the outbreak of the First World War the efforts of foreign concessionaires had provided Iran with the barest outlines of a transport system. These rudiments of a transport network were essentially all roads. Navigation on the Karun River was important, but the river directly served

only three towns--Khorramshahr, Ahvaz, and Shustar. Good roads from Ahvaz and/or Shustar were necessary to fully exploit the advantages afforded by the river, and a start had been made in this regard. For all practical purposes Iran totally lacked railways. The six miles of track from Tehran to the Shah Abdul Azim shrine was of no economic consequence. Likewise the seven mile narrow gauge rail line from Rasht to Pir-i Bazaar outside of Enzeli contributed little, if anything.

Such roads as did exist were deficient in several respects. Road construction had been concentrated in the northwestern region and to the south of Tehran toward the head of the Persian Gulf. Moreover, construction mostly originated at the major ports on the Caspian Sea and Persian Gulf or at the land entry points into Iran and proceeded inland to the major urban centers. Roads were often extended to Tehran as the city was the most lucrative market in the country as well as the locus of national political influence. No significant attempt was made to link the several major urban centers to one another if they did not lie along a route between a point of entry and the capital. It also appears that no one even considered extending roads into the provincial areas.

Generally the standards of pre-World War I road construction were different from those for modern road work. Frequently the road construction followed the alignments of old caravan routes or mule tracks and only upgraded them to a condition suitable for cart or carriage traffic. Often times the roads were simply of dirt construction lacking any base or surfacing, and they retained the previous steep slopes and sharp curves. While such an approach reduced costs and was justifiable prior to the advent of motor vehicles, these roads were not suitable for motor

vehicles and became obsolete once motor vehicles were introduced. The Russian built roads between Julfa and Tabriz and between Bandar Pahlavi and Qazvin were notable exceptions to the general pattern as they had been built with future railway development in mind. They were so-called metalled roads, that is they were fully constructed with a base of broken or crushed stone over which a surface of gravel was laid. Hence these two important routes could more readily sustain motor traffic. All roads were subject to interdiction by snow in the winter and rains and floods in the spring, and a general lack of adequate maintenance resulted in serious deterioration in many areas.

One of the most glaring deficiencies was the lack of a good road link between the capital and the Persian Gulf region. The British plans for a Tehran to Ahvaz road had not been fulfilled. Connections between the northern and southern regions remained primitive and arduous. The full extent of the difficulty of internal transport is vividly revealed by the fact that

in 1914 the journey from Khorramshahr to Tehran took three weeks to a month, and personnel of the oil company in Khuzistan discovered that it was quicker and much more convenient to travel by boat from Khorramshahr via the Suez Canal and Istanbul to the Russian Black Sea port of Batum, from there by rail to Baku, and then by ship across the Caspian to Bandar Pahlavi, and finally by road to Tehran.³⁵

Just prior to the outbreak of war Russia revived the plans for a Julfa to Tabriz railroad, last heard of nearly forty years previously in the Falkenhagen concession of 1874. After considerable pressure being exerted upon it, the Iranian government on 6 February 1913 granted the Russian Discount and Loan Bank a seventy-five year concession for the railway with a branch line to Lake Urumiya (Lake Rezaiyeh) and the right

to exploit coal and oil deposits within sixty miles on either side of the line. The Company was to pay Tehran half of its net profits from the railway operations and five percent of those from mining. The company was also exempt from Iranian taxes.

The date of completion of this rail line is not at all clear. One author asserts the bank was able to complete the line after one year,³⁶ although he may have been referring only to the main line to Tabriz. Another author indicates "the railway was opened in February 1917, with a rolling stock of thirty locomotives and over 400 goods-trucks."³⁷ Yet a third author opts for a middle position by placing completion of the main route to Tabriz shortly before the beginning of the war and making construction of the branch line part of Russian military activities within Iran during the war.³⁸ In any event, the eighty-five mile main line and the thirty mile branch line from Sofian to Sharafkhaneh on Lake Rezaiyeh were in reality extensions of the Russian Caucasian rail system and, as such, were built to the Russian broad five foot gauge. The line was of great significance as it more closely linked the populous and productive Azerbaijan region to Russia economically. The railway suffered heavily during the war and was not repaired for some time. After the war "trains were run only twice a week, and the tariff was so high that the pack and motor transport routes, which ran parallel to it, were able to compete."³⁹ In the Irano-Soviet Treaty of 1921 the new Soviet government surrendered its rights to the railroad, and the Iranian government assumed ownership and operation of it.

The First World War stimulated several significant developments in Iran's transport facilities, but once again these were not undertaken by the Tehran government. Rather Great Britain was the dominant force in

the several improvements to the road network and the introduction on a large scale of motor vehicle transport. As the various construction activities supported the military operations of the war's belligerents within Iran, they grossly violated Iran's announced policy of neutrality. Because the improvements were designed to facilitate foreign intrusion into the country, they largely continued the pattern of transport development of the pre-war years.

The early years of the war witnessed little alteration in the transport situation. In their operations through Azerbaijan in 1915 the Russians made good use of the railway to Tabriz and constructed extensions towards the Turkish border. All of the extensions were later abandoned except for the originally envisaged branch line to Lake Rezaiyeh. In their supply operations the Russians employed only a limited number of automobiles relying instead upon railways and wagons. To the south the mixed force of British-Indian troops and Iranian gendarmerie possessed a few automobiles which only assisted in the transporting of supplies. In this way the first cars made the trip from Bandar Abbas to Kirman and to other relatively isolated towns.⁴⁰

The scope of British transport activities markedly increased in 1918 as London reacted to the consequences of the Bolshevik Revolution. When the Soviets withdrew from the war, Britain felt compelled to move into western Iran so as to counter any Ottoman incursions. Later Britain moved on to Baku to assist the White Russians against the Soviets. The British line of communications between Baghdad and Baku had no choice but to extend across Iran. Thus Royal Engineers constructed a wide, carefully-graded metalled road from Khanaqin on the Iraq-Iranian frontier

to Kermanshah and improved the existing cart rack from there to Hamadan. From this point to the Caspian the British employed the roads constructed by the Russian Insurance and Transport Company of Persia which only required maintenance to meet the needs of the British forces. However, by this time considerable maintenance was necessary if a Russian report of 1915 was not too grossly exaggerated. The author strongly complained that "the first-class road Enzeli to Tehran . . . is in a state of perpetual disrepair . . . as a road for vehicular traffic it is very primitive . . . in truth it is a gigantic ditch full of mud."⁴¹ Nevertheless the route was upgraded sufficiently to enable the sustained transport of troops and supplies by motor vehicle.

In southern Iran other British forces were engaged in suppressing tribal disorders. Some forty miles of light railway was laid from Bushire to Borazjan at the foot of the mountains. However, as far as Iran was concerned the effort was futile as the rail line was later sold to Indian contractors and torn up. The British forces also built a motor road up the succession of steep mountain sides to Shiraz. Consequently, "with the assistance of the local inhabitants, Ford cars pushed their way from Shiraz to almost every town of importance within a hundred miles radius. The road to Isfahan was rendered passable for light cars, and thence to Yazd and Kerman."⁴² Finally regular motor-car trips were made from the Persian Gulf to Tehran.⁴³

The final region of British transport activity was in the east extending southward from Mashhad. The British Indian government extended the Indian Northwestern Railway some 100 miles into Iran from the Iran-Baluchistan border town of Mirjaveh to Zahedan (Duzdab). The

railway was built to the very wide 5'6" Indian gauge. British military forces improved extensive portions of the route from Zahedan to Mashhad and maintained the road so that it was "suitable" and in some sections "easily traversable by motor lorries." Regular trips were made to Mashhad with military motor cars able to cover the distance in four days whereas caravans required four to six and sometimes eight weeks.⁴⁴

Although these foreign military operations were not in the least welcomed and some of the campaigns involved much damage, Iran did benefit by the additional road construction and improvements to existing roads. Moreover, the British activities amply demonstrated the utility and advantages of motor transport over large areas and no doubt stimulated the subsequent growth in motor vehicle usage. Finally many Iranians received training in road construction, as well as in driving and servicing vehicles.

In 1921, though somewhat better provided than at the outbreak of World War I, Iran still possessed only the barest rudiments of a true transportation system. Due to a lack of adequate maintenance even some of the recent wartime construction had seriously deteriorated. The serious deficiencies in the transportation network commenced at the several ports on the Caspian Sea and Persian Gulf.

In 1921 Iran's major Caspian Sea port was Bandar Pahlavi, then called Enzeli. The port was linked to Baku by a Russian steamship service. The port and its electricity installations had been Russian concessions until 1921 when by the Irano-Soviet treaty of that year they were relinquished to Iran. The port possessed a moderately well equipped pier yet access was hindered by a bar and narrow entrance.

These necessitated the lightering of goods onto a type of sloop called "kirdjims." The landing stages were in need of repair.⁴⁵

On the Persian Gulf the principal ports in 1921 were Bandar Abbas, Bushire, and Khorramshahr, then called Mohammareh. Khorramshahr had become the principal port for southwestern Iran. The port was located at the confluence of the Karun and Shatt al-Arab rivers approximately 40 miles from the Gulf. It was thus the transshipment point for goods being shipped up the Karun river to Ahvaz. Ocean going vessels were able to reach the port. However, cargo discharge was by lighters which unloaded at bankside quays on the Karun river front.

Bandar Abbas and Bushire were both located on the Persian Gulf, but in 1921 both suffered severe deficiencies. Bushire was an open roadstead having two anchorages, the inner one three miles from shore and the outer one seven miles from shore. Cargoes were transferred from the anchorages to shore by sailing dhows. In spite of this Bushire had become a major port due to its road links with Shiraz and Isfahan. Bandar Abbas was much less used than the other two ports. This was due to its location at the far south of the Persian Gulf. The region inland of the port was the least developed region of Iran.⁴⁶ The road to Kerman was not completed until near the end of World War I, and there were no adequate connections to Shiraz. The port itself was only a partially sheltered roadstead whose anchorage was three miles off shore. Cargo was lightered to and from the ships by sailing dhows.

Moving inland, Iran did not possess anything even resembling a railway system. In the entire country there were only approximately 260 miles of track,⁴⁷ and large portions of that were not in complete repair

or operation. Moreover, this total was severely fragmented into several short lines in widely scattered areas of the country and possessed differing gauges. In addition to the rail lines previously mentioned, the only other significant route was the light railway operated by the Anglo-Persian Oil Company near Ahvaz and in and around the Abadan oil refinery. The wide dispersion of the various rail lines and their diverse constructions meant that Iran had virtually no base upon which to develop its own network.

In 1920 Iran possessed approximately 2,000 miles of roads usable by wheeled carriages and even the tougher motor vehicles. Perhaps the two best roads in the country were the Russian built metalled road from Hamadan to Bandar Pahlavi through Qazvin and the metalled road connecting Hamadan with Kermanshah and Iraq which had been constructed by British troops during the war. This road linked with a branch of the Iraqi railway at Khanaqin. A fair unmetalled road joined Tehran to Qazvin thereby giving the capital adequate access to both the branch line of the Baghdad railway and the port of Bandar Pahlavi. Another fair unmetalled road proceeded from Qazvin to Tabriz where the Iranian extension of the Russian Caucasian railway terminated. Fair unmetalled roads also ran from the capital to Bushire via Isfahan and Shiraz and to Mashhad, Kerman, and Arak, then called Soltanabad.⁴⁸ Noticeably absent in this listing are adequate connections between the port of Khorramshahr and Isfahan and Tehran.

In 1921 the dominant mode of transport remained the slow moving camel or mule caravans. Over rough tracks these were not able to travel more than 20 to 25 miles a day. The construction of roads since the

late nineteenth century had enabled the introduction of wheeled vehicles which did speed up communications slightly. Yet these did not seriously challenge the primacy of pack transport. Motor vehicles were only beginning to appear in numbers in the capital. In the spring of 1920 there were ten cars in Tehran, but eighteen months later the number had risen to 250.⁴⁹

Notes for Chapter 2

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Chapter III

The February 1921 coup d'etat which made Sayyid Zia ud-Din Tabatabai Prime Minister and Reza Khan War Minister and Commander-in-Chief of the army inaugurated a new era in Iran's history. Although Sayyid Zia shortly disappeared from both the government and the country, Reza Khan remained to become Reza Shah Pahlavi in December 1925 and the driving force behind most of what occurred in Iran until his abdication in September 1941. Reza Shah was intent upon asserting the actuality of Iran's sovereign independence. He vigorously pursued a policy of modernization in nearly all aspects of Iran's life as part of his effort to free the country from foreign domination. This included an ambitious program of economic development. He further intended to make the authority of the government effective throughout Iran and eliminate the considerable turmoil that had existed since the Constitutional Revolution of 1906-1907. In particular this required subduing the numerous independent-minded tribes.

All of this required a greatly improved system of internal communications. Indeed much of the program could not be accomplished without better communications. The subjugation of the tribes depended upon pushing roads into country where nothing but tracks had existed. Thus throughout his rule Reza Shah pushed an ambitious program of road and railroad construction. The various projects were all formulated with strictly national rather than international interests in mind.

The center piece of the regime's transport development program was the construction of a Trans-Iranian Railway. This project held primary

position in a list of priorities that emerged from a complete study of the country's transport problems that had been initiated in 1924.

The possibility of constructing a railway across Iran had exercised the imaginations of many men and had caused concern to various British and Russian diplomats for more than half a century before the beginning of the Trans-Iranian rail road. Many different proposals had been advanced to be hailed or condemned and frequently both. During the nineteenth century two concessions were made for constructing a trans-Iranian rail line. Yet only one succeeded in laying any tracks. Thus when Reza Shah came to power the dream remained to be realized. By this time, however, construction of the railroad had come to mean more than an economic or strategic project. "Railway construction was tantamount to progress, sovereignty, and national status."¹

In selecting the route for the new railway Reza Shah considered only strictly national needs, and strategic factors played an overriding part in his thinking. Iran has always been both blessed and cursed as the crossroads or link between Asia and the Mediterranean regions. Iran also lay astride the overland approaches to India from Europe. It was this position that had led to the considerable European involvement of the nineteenth century. Reza Shah had no desire that the railroad should facilitate the expansion of European influence into his country. Thus he deliberately chose not to link the rail line to any of the railways in neighboring countries. That he ignored the grand schemes for international rail systems of European planners was one of several reasons for the severe criticism that the route received.

A north-south route linking the capital with a Caspian Sea port and

with a Persian Gulf port would definitely assist in national integration. Adequate communications between the capital and the Persian Gulf region had long been lacking, particularly with the Khuzistan area at the head of the Gulf. Due to its isolation this region had only recently displayed a marked independence from Tehran. A rail line would both expedite movement of goods from the Gulf to the capital and enable a more effective projection of government power into the region. Likewise, the link with a Caspian Sea port would facilitate trade with the Soviet Union and tie the surrounding region of the port more closely to Tehran. Yet the precise route selected has elicited considerable criticism.

In several respects the proposed route started in the middle of nowhere, terminated in the middle of nowhere, and for long stretches journeyed through nowhere. The most obvious site for the Caspian terminus was the port of Bandar Pahlavi. It was already Iran's principal Caspian port. Yet it was rejected, and an entirely new site chosen along the southeastern littoral in the province of Mazandaran. The new port was named Bandar Shah.

The selection of the new site is difficult to understand. Tehran already had a road link with Bandar Pahlavi and to duplicate the motor road with a rail line may have been considered wasteful.² Also Reza Shah may have deemed Bandar Pahlavi more susceptible to Russian influence than the new site.³ The site would certainly benefit the province of Mazandaran, "where Reza Shah originated, where he had acquired large estates and where he established cotton spinning and silk factories."⁴ In his defense of Reza Shah's route Elwell-Sutton noted that troops and

supplies could be brought from Mazandaran and the capital to the south and that the important products of the province would be available to the rest of the country and in turn the Caspian provinces would be less dependent upon the Soviet Union for supplies and markets.⁵ Yet virtually the identical comments could be made for having the terminus at Bandar Pahlavi. Further the site selected was certain to create many difficulties. The water was shallow, and silting was rapid.

The site of the Persian Gulf terminus also surprised many although its selection is more readily understandable than that of Bandar Shah. There were three significant ports in the Gulf. Bandar Abbas was rejected because of its great distance from the capital. Bushire, which was the port for Shiraz and Isfahan, was most likely passed over because of its distance from Tehran and more especially because of its poor ship anchorages. Khorramshahr seemed the most likely selection. A line to this port would open up the largely isolated Khuzistan region. Deep draught vessels could approach fairly close to shore. Facilities already existed and could be expanded without too great a difficulty. Yet the port's location caused Reza Shah to reject it on strategic grounds. Lying approximately 40 miles up the Shatt al-Arab, Khorramshahr was definitely vulnerable to British influence and interference. Moreover, the boundary in the Shatt al-Arab between Iran and Iraq was still unsettled. Placing the Persian Gulf terminus at this port would undercut the very independence Reza Shah was attempting to assert. Reza Shah decreed that a new port be constructed near the head of the Khor Musa inlet, a deep water inlet at the head of the Persian Gulf. The actual site was a low lying island in the midst of mud flats where nearly nothing then existed.

The route in the interior passed through few of Iran's major urban centers. No less than eight of Iran's fifteen principal cities were not served by the railway including such major cities as Tabriz, Isfahan, Mashhad, Shiraz, Hamadan, and Kermanshah.⁶ The only major cities on the route were Tehran, Qom, and Ahvaz. Throughout much of its length the route passed through extremely difficult mountainous terrain which presented formidable obstacles to the construction effort. Literally hundreds of tunnels and bridges had to be built to overcome the topography and in places the roadbed had to be blasted out of the sheer face of the mountains. Although the completed railway was a considerable engineering triumph, the remoteness of long stretches of the route served to reduce the usage of the line.

The manner of financing the railway's construction placed an onerous burden upon the general populace. It was realized that the construction would be exceedingly costly, and it was widely believed that the country was incapable of marshalling the necessary funds internally. It seemed Iran would have to rely upon foreign loans to finance the great assertion of national sovereignty. However, the experience of the previous several decades with foreign loans had left an extreme distaste for and distrust of such loans. Nevertheless, an attempt was made to negotiate a \$40 million loan with the United States.⁷ When the negotiations failed, Reza Shah decided to rely solely upon internal revenue rather than abandon the project.

The issue then became identifying a means for rapidly accumulating the large sums needed. "The low level of income and the difficulties in the collection of internal taxes precluded any form of tax on income or

direct taxation."⁸ The government thus turned to the tariff structure on foreign trade.

As at the time Iran lacked tariff autonomy, the government could not directly raise tariffs. An interesting device was used to bypass this legal hindrance. In May 1925 the Majlis enacted legislation creating a government monopoly on the importing and selling of sugar and tea. The government monopoly placed a surcharge upon sugar and tea products beyond the actual importation costs and customs duties. The effect of the surcharge was the same as increased tariffs. The funds raised from the monopoly were to be used exclusively for railroad construction.

Tea and sugar were not randomly chosen as the objects of this action. Together, they ranked second amongst Iran's total imports. In the year ending 21 March 1925 imports of tea and sugar accounted for 28.6 percent of total imports. Only textiles exceeded this with 35.2 percent of the total. However, unlike textiles, sugar was not produced at all in the country and the production of tea was insignificant.⁹ Thus the surcharge could not be avoided by shifting to domestic substitutes. "Because of the low nutrition value of the Persian diet, particularly that of people in the lower income bracket and of the masses of the peasants, sugar was serving as a substitute for high calorie food and as such was an essential part of the daily diet."¹⁰ Moreover, many years before tea had replaced coffee as the chief beverage. Thus it was highly unlikely that a higher market price would greatly reduce demand. The great disadvantage of this arrangement was that its burden fell most heavily upon those who could least afford it and who most needed

the daily sugar consumption.

The new imposts succeeded in rapidly raising large amounts of revenues, and the railway was financed entirely from domestic sources. The sugar and tea taxes provided about 65 percent of the total cost. Another 20 percent came from state subsidies, and most of the remainder from loans from the Bank Melli Iran.¹¹ The total cost of the railway was estimated at £30 million with roughly 40 percent consisting of foreign currency commitments.¹²

The Majlis passed enabling legislation in March 1926, and after initial surveying, construction commenced at both termini on 17 October 1927. As nationalistic motives had played a large part in choosing the route, so did they also affect the manner of construction. A quite high proportion of the necessary equipment and machinery for construction and operation of the railway had to be imported. Also the planning and supervision of the actual work had to be carried out by foreigners. To alleviate possible dependence upon any one nation, importation of materials and the letting of contracts were spread over many countries.

The overall management structure underwent several revisions. Initially American engineers and a German expert in the employ of the government supervised the work. However, in April 1928 the management was entrusted to a syndicate of one American and three German firms. The Germans in the north had completed an 80 mile sector from Bandar Shah in November 1929 and the Americans had opened 156 miles from Bandar Shahpur to Dizful when difficulties over the contracts caused delays. In 1931 the government cancelled the contracts and resumed direct supervision. In 1933 the government contracted with the Danish-Swedish

syndicate Consortium Kampsax, which in turn subcontracted portions of the project to firms from numerous European nations including Great Britain, Italy, Belgium, Sweden, and Czechoslovakia.

Likewise no one country was favored in the acquisition of materials. The steel for the rails and some of the cement was provided by the Soviet Union. Australia supplied the sleepers and Sweden the locomotives which were oil fueled. Iran acquired the remaining rolling stock and machinery from Belgium, Germany, and the United States. Finally Japan and Yugoslavia provided additional cement. By this dispersion Iran avoided even seeming to favor or be influenced by any one nation.

After the Consortium Kampsax began operations work proceeded rapidly, and on 19 February 1937 the first train departed Bandar Shah for the capital. In November that year construction was completed to Qom. Reza Shah laid the last rail connecting the northern and southern sections in the mountains south of Arak on 24 August 1938. On 23 December the first through train on the central section departed Tehran for Ahvaz. After eleven years effort the 862 mile single track standard gauge rail line was completed.

The project had provided considerable employment and experience for the Iranians. They comprised 90-95 percent of the 60,000 workers employed at peak times.¹³ Further a large number of Iranian students were sent to Europe to study various phases of railroad construction and operation. A number of Iranians gained their initial experience in contract work as subcontractors to the foreign firms for materials and transport.¹⁴

The completion of the Trans-Iranian Railway in no way marked the

end of railroad construction during Reza Shah's rule. The north-south route had become the first portion of an intended network that would extend into most areas of the country. The main trunk route was to be complemented by an east-west route across the north of the country which would join Mashhad and Tehran with Qazvin and Tabriz. A south-easterly branch was to depart from the main line at Qom and, passing through Kashan, reach to Yazd. It was intended to eventually extend this line through Kerman to Zahedan. These additional routes to some extent met the criticisms directed toward the main line. Tabriz in the populous Azerbaijan region and Mashhad in the northeast were the second and fourth most important urban centers in Iran respectively. At Tabriz the east-west route could link with the rail line from Julfa; however, the difference in gauges would prohibit through rail service from the Soviet Union into the interior of Iran. Kashan and Yazd had not been well served by roads, thus the railroad would help to integrate them into the national economy. Yet the entire southeastern branch and most especially any extension of it to Kerman and Zahedan was not warranted from a strictly economic perspective. The economic objectives could be attained much more efficiently by constructing adequate roads. The continued omission of the country's third most important urban center Isfahan from the railway network is most striking and difficult to understand.

Construction was begun on these routes even before the main line was completed. The first to be started was the line to Mashhad in March 1938.¹⁵ The route separated from the main line at Garmsar some 60 miles east of Tehran. By the end of 1941 trains were operating on the line as

far as Shahrud, 195 miles beyond Garmsar and nearly half way between Tehran and Mashhad, and the roadbed was completed for an additional 125 miles. In January 1939 work began on the line to Tabriz. By the end of 1942 the line was operational to Mianeh, 273 miles from Tehran and about two-thirds of the way to Tabriz. On the south-eastern branch by 1941 the roadbed had been constructed to within 40 miles of Yazd but no track had been laid.¹⁶ The construction of these lines was under the supervision of the Ministry of Roads and Transport.

During the reign of Reza Shah a pattern of road construction activity emerged which has largely remained during the succeeding decades. The government has had to repeatedly rebuild the main communication routes. The same trunk routes appear in the early government construction plans as are listed in the national development plans of the 1960s. It was not that the early construction work was substandard or shoddy. Many of the roads constructed during the reign of Reza Shah were then first-class highways. Rather it was that the standards of road construction continuously improved and that the demands made upon the roads ever increased. In the understandable interests of economy, the early roads were built to handle the type and amount of traffic then reasonably anticipated. Yet the early roads, built to accomodate horse drawn carriages and the early motor cars and lorries, were neither wide enough nor had a solid enough base to carry heavy truck traffic.¹⁷ The first step was to upgrade the more important routes to metalled roads. Less important routes became second- and even third-class roads. The sustained truck traffic during the operation of the World War II Persian Corridor and the increased size of the trucks employed demonstrated the limitations

of the metalled roads. After the war the government undertook to pave those primary roads not already paved by the Allies during the war. Increased traffic and larger vehicle size also impacted the second- and third-class roads, necessitating their upgrading. Sometimes increased usage required that earlier second-class routes be included in the primary system as regards standards of construction. Standards other than width of road and surfacing material also became more demanding such as road drainage and culverts and radius of turns. Consequently the government had to return to the same routes twice or more for work beyond normal maintenance activities. The resources demanded by these efforts frequently came at the expense of creating a system of feeder roads to link the trunk routes with small towns and the thousands of villages in Iran. Thus the construction of feeder roads was long delayed.

The government became directly involved in road construction and maintenance in 1921 when, as part of the Irano-Soviet Treaty of that year, the Soviet Union handed over to Iran the various roads that had been built and operated by Russian concessions. Two years later a Department of Roads and Bridges was established in the Ministry of Public Works,¹⁸ and a member of Dr. Millspaugh's American Financial Mission became the Director-General of Roads. During the next two years a number of the contracts to private individuals for the construction and operation of roads in exchange for the privilege of collecting road tolls were annulled.¹⁹ The reason was nonperformance of the contract as the contractor frequently did not adequately maintain the

road. In 1930 the Department of Roads and Bridges became a separate ministry, the Ministry of Roads and Transport.

The first task facing the government in its new responsibilities for road operation was emergency repair. Dr. Millspaugh noted that when his Financial Mission arrived in 1922 the metalled roads linking the Iraqi border at Khanaqin and the cities of Kermanshah, Hamadan, Qazvin, and Bandar Pahlavi were rapidly deteriorating and other roads were in bad condition.²⁰ Even in 1925 a considerable proportion of the 2,000 miles of chausee roads listed by the government was either derelict or in very poor condition.²¹

Early in 1925 the Economic Commission of the Majlis developed an ambitious program of highway construction and maintenance to be financed by a new scheme of taxation. The program was passed into law in February 1926 as a nine year road plan. The plan, as laid out by Mills-paugh in 1925,²² consisted almost exclusively of trunk routes radiating outward from the capital. The proposed construction would link Tehran to most of the major cities of Iran and to the major points of entry. The preponderance of the roads were in the north and west. A road was to be pushed from the capital through the Zagros Mountains down to Khorramshahr. Eastern Iran was provided with a link from Mashhad down to Zahedan. Southern Iran and the eastern slopes of the Zagros were strangely missing from the list. There was no mention whatsoever of feeder roads.

This extensive construction program was financed by a revised scheme of road taxes. Tolls had been common and frequently heavy on the several constructed roads, and municipal taxes were levied on imports

and exports. The February 1926 law abolished these various levies and replaced them with a road tax on the gross weight of all imports and exports that was levied at the frontier. It was estimated the tax would bring in £200,000 annually.²³ Also "in 1926 registration and licensing of vehicles were introduced, all the revenue from these measures being earmarked for road construction."²⁴ After the end of the nine year program the government continued an intensive road building program. In fiscal year 1939-40 the Ministry of Roads and Transport received 32.7 percent of the total budget and in the following year 31.1 percent.²⁵ These allocations to the ministry included funds expended on railways and port development as well as road construction and maintenance.

The nine year program originally stipulated that approximately 10,500 miles of roads be built. This included first- through third-class roads. When the program ended before 1937, the constructed mileage exceeded the planned mileage by about 2,500 miles.²⁶ By 1938 approximately 3,000 miles of first-class highways, i.e. metalled roads, had been built.²⁷ Afterwards the Ministry of Roads and Transport set itself the goal of building 1,000 miles of road annually.

By the time of the Allied invasion in August 1941 Iran's road network had considerably improved over what it was in 1921. Virtually all of the principal cities could now be reached by motor traffic during some parts of the year. Usable roads now connected the capital with the port of Khorramshahr. A start had been made on paving the most important roads when stretches of the three main routes leading out of Tehran had been asphalted.²⁸ The road network was more nearly adequate

for Iran's needs. Yet the roads failed to match the standards of construction and adequacy then being used in the United States or Europe.

"In 1941, were an American or a western European to have traveled by road to Iran, he would have found it difficult to believe that any attempt had been made at road improvement."²⁹

The expansion and improvement of the road network greatly encouraged the use of motorized transport. The elimination of road tolls and the various municipal levies provided a further impetus. Before 1924 there were only about 1,000 vehicles in the country, about half of which were in the oil company's concession area.³⁰ By 1941 the number had risen to about 25,000 motor vehicles of all kinds.³¹ As a result trucks largely displaced pack animals for the transport of goods on the main routes. Motor transport also drastically cut travel times between urban centers. All these advances resulted in sharp drops in the cost of transport. "Inland freight rates fell in real terms by 40-50 percent during 1924-26 and by 75-80 percent during 1927-29."³²

Port development activity during the rule of Reza Shah was heavily concentrated at the two new ports of Bandar Shah and Bandar Shahpur. Little work was accomplished at the existing ports. The only other activity of note was the beginning of a second new Caspian port at Naushahr.

The construction of Bandar Shah would be extremely difficult if not impossible to justify on strictly economic and technical grounds. One author simply asserted that "this port, isolated in barren country, can not have a future."³³ The port was located five miles south of the mouth of the Gorgan River on the east coast of the Caspian Sea.

Any location on the Caspian would be adversely affected by the sinking of that sea yet the receding "makes itself felt more on the shallow eastern side."³⁴ The site was surrounded by marshes and the immediate offshore water was shallow and subject to rapid silting. Nevertheless in 1926 construction commenced on a wooden jetty over a mile long so that railway construction material and rolling stock could be imported. When completed about 1930, the single jetty stood unprotected in the shallow water and had berths for four to five vessels of 800-1,000 tons. The port was reached from open water by a $7\frac{1}{2}$ mile long channel. Both the port area and the approach channel required continuous dredging. If properly maintained, the port had an estimated capacity of 1,200-1,500 tons daily.³⁵

The site of the Persian Gulf terminus of the Trans-Iranian Railway was only somewhat less adverse than that of Bandar Shah. Bandar Shahpur was sited about 45 miles up the Khor Musa inlet from the head of the Gulf. The Khor Musa bar permitted access to deep draught vessels as there was not less than 24 feet of water over the bar at low tide. The actual port and rail terminal area was created by raising an area about one mile long by 400 yards wide some five to eight feet above the surrounding mud flats.³⁶ The sole connection to the mainland was the railroad embankment across six miles of mud flats.³⁷ The desolation of the site was enhanced by the lack of fresh water. Initially a wooden jetty was built in 1929 for landing railway construction material for the railroad. It was extended by steel construction in 1936 to provide two deep water berths.³⁸ The capacity was estimated as 800-1,000 tons daily.³⁹ The port was declared open in November 1932.

Little reason could be discerned for the construction of Naushahr and certainly the resources expended in creating it were needlessly spent considering the contemporary economic circumstances. Located about $1\frac{1}{2}$ miles east of the mouth of the Chalus River on the southern shore of the Caspian in the province of Mazandaran, it was an artificial harbor. The location was badly chosen as it was liable to rapid silting from both the Chalus River and a small stream that flowed directly into the harbor.⁴⁰ The Netherlands Harbor Works Company commenced construction on the harbor works in 1935 on the order of Reza Shah. Considerable work remained to be accomplished including harbor dredging when the Soviet Union occupied it in 1941.

Aviation in Iran had its origins with British activities during World War I. Detachments of the British air force were stationed at three locations in the country during 1918. The government frequently requested their assistance for punitive operations against recalcitrant tribes.⁴¹ However, these activities provided little more than a demonstration of the utility of air operations.

Regular air service within Iran was initiated by the German firm Junkers Air Services. In February 1927 the firm was granted the rights for establishing air passenger and mail service between Europe, Iran, and points farther east in Asia. The contract permitted the firm to operate these same services between cities within Iran and required the establishing of pilot training schools and major repair plants in Iran.⁴² By 1929 routes extended outward from Tehran in four directions. One route extended to Bandar Pahlavi and thence to Baku; another to Mashhad and thence into Afghanistan; a third to Bushire via Isfahan;

and the last to Baghdad via Kermanshah and Hamadan. Flights were usually made twice weekly.⁴³ Junkers ceased all its Iranian operations in 1932.

After a three year lapse the government resumed air operations itself. The government acquired a number of planes from Europe and started regular passenger and freight services to Baghdad via Kermanshah and to Bushire.⁴⁴ The Ministry of Posts and Telegraphs operated these services with pilots from the Iranian air force. The planes were maintained at Iran's aircraft factory which was well equipped for assembling, repairing, and overhauling aircraft.⁴⁵ There were numerous landing strips throughout the country but few of them were in good repair.

On the eve of its forced direct participation in World War II Iran had vastly upgraded its transportation facilities and, except for the initial phases in air transport, had done so almost exclusively through its own resources. For the first time in centuries the country possessed a national network able to support political integration and a free flow of internal trade. The transportation system, except for the lack of feeder roads into provincial towns and villages, was largely adequate for its current needs. Indeed, the railroad greatly exceeded those needs. However, this system and especially the railroad lacked by far the capacity to move the quantities of materials the Allies envisioned moving through Iran to the Soviet Union.

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³⁵United Kingdom, pp. 510-11.

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³⁹United Kingdom, p. 502.

⁴⁰Ibid., p. 511.

⁴¹Wilson, p. 108.

⁴²Banani, p. 136.

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⁴⁴Elwell-Sutton, p. 100.

⁴⁵United Kingdom, p. 464.

Chapter IV

The story of Iran's transportation system during World War II is essentially the narrative of the Allied effort to move war materials through Iran to the Soviet Union. Due to the overwhelming presence of the Allied forces most Iranian activities were likewise focused in this direction. It appears that very little construction or maintenance was performed in areas outside of the supply routes to the Soviet Union. In these other areas the war years were a time of deterioration. By contrast significant improvements were made in the few routes ultimately selected for the movement of war materials.

Iran's enforced participation in the herculean supply effort to the Soviet Union grew out of its invasion by British and Soviet forces on 25 August 1941, caused by apprehension over the large German presence in Iran and the attractiveness of the country as a supply route to the Soviets. During the 1930s Germany had assumed an increasingly prominent position in both Iran's foreign trade and its internal affairs. Germans were appearing as advisors to various ministries and were playing an important part in the modernization programs. Both London and Moscow evidenced concern even before the eruption of hostilities in Europe. With the outbreak of war first the British and after June 1941 the Russians viewed the Germans in Iran as immediate threats to their positions.

Reza Shah attempted to maintain neutrality, but neither power was satisfied with the magnitude of the German presence, the freedom it evidently enjoyed, nor its apparent suitability for hostile action. The

demands increased that the Shah take strong measures against the Germans. These demands were not complied with. All the while the Trans-Iranian railroad remained a highly alluring alternative to the dangerous arctic route for moving badly needed war supplies from Great Britain to the Soviets. Thus the two nations invaded Iran on 25 August 1941.

The new relationship between the three countries was not formally regularized until the signing of the Tripartite Treaty on 29 January 1942. By Article 311(b) Iran granted Britain and the Soviet Union "the unrestricted right to use, maintain, guard and, in case of military necessity, control in any way that they may require, all means of communications throughout Iran, including railways, roads, rivers, aerodromes, ports, pipelines, and telephone, telegraph and wireless installations. . . ."

Allied operations did not await the formal signing of the Tripartite Treaty. The two powers divided Iran into zones of occupation or rather zones of control, as by the provisions of the treaty the Allied presence was not considered a military occupation. The Soviets occupied Iran north of the capital and the British south of the capital. Tehran was to be jointly occupied. By the end of September 1941 the two powers had effectively assumed control of Iranian communications in their respective zones.

Even prior to American entry into the war the United States had become involved in the transportation of war materials through Iran. Shortly after the Anglo-Soviet invasion Great Britain formally requested American assistance in upgrading the capacity of the Iranian State

Railways. Such aid was to be provided under the provisions of the Lend-Lease Act.

From September 1941 American plans and activities regarding Iran continuously increased and expanded in scope. Prior to December 1941 the United States involvement was at the invitation of Great Britain, and American aid was in a strictly auxiliary status to British operations and responsibilities.¹ After United States entry into the war the plans for American aid and activities abounded. The scope of proposed American operations expanded. But as the United States never became a signatory to the Tripartite Treaty, the American forces always remained formally an associate to the British and the responsibility for operations technically remained with the British Command.

Due to the size and complexity of the aid to Russia task, the assumption by American forces of selected British operations was an evolving process that extended for over a year. The Persian Gulf Service Command which conducted all American supply-to-Russia operations in the Persian Corridor did not formally come into existence until 11 August 1942 and even then it was subordinate to a headquarters in Cairo. The command attained an independent existence on 10 December 1943 as the Persian Gulf Command. While the organizational structure evolved, American forces assumed operational control of different parts of the transport network within the British zone of control.

The Iranian State Railways early became the major focus of transport across Iran to the Soviet Union. Allied planning intended the railway to be the primary mode of moving war materials. Yet in 1941 the Iranian railway system suffered under several severe limitations and major

upgrading work would be necessary to enable it to meet the objectives set for it.

The division of the control and operations of the railroad system according to zones of occupation occurred soon after the invasion. In September 1941 the Soviet Ambassador at Tehran proposed that each occupying power operate the rail lines within its respective zone. There was no formal agreement to that effect, but separate operations proceeded as if there were.² The Russians established a Soviet railway headquarters at Tehran and went their separate way despite British and some American qualms "that divided operating control would make for reduced railway capacity and would cause complications with the Iranian railway administration."³ The British established the British Transportation Service in Tehran in October 1941. The service had a strength of approximately 2,500 men and performed extensive improvements along the rail line.

American operation of the British sector of the railway was charged to the Military Railway Service (MRS) of the Persian Gulf Service Command. The MRS which was formally constituted in December 1942 assumed its tasks on 1 January 1943. After a transition period of three months on 1 April 1943 "responsibility for control of operations and maintenance of the Iranian State Railway between Tehran and Persian Gulf ports . . . devolved upon the MRS."⁴ The MRS operated and enhanced the capacity of the rail line until 25 June 1945 when it returned the railway to British forces.

During their period of operational control the British carried out considerable construction and added locomotives and rolling stock

in an effort to greatly increase the rail line's carrying capacity. When taken over, the rail line was only equipped and staffed for very light traffic, carried by not more than one freight train a day.⁵ At this time the estimated daily carrying capacity of the rail line was 200 tons per day.⁶ "Though there were sufficient locomotives and rolling stock for this load, a very large percentage was laid up for repair or was unsuitable for increased and continuous work on a difficult line with severe gradients and in a country with such extremes of climate."⁷ One anecdote perhaps serves to reveal the extent of the task facing first the British and then the Americans. In January 1943 when the first American railroad troops were moving to their new station in Tehran, they had to get out and push the train up the more difficult grades in the Zagros Mountains.

One of the British Transportation Service's major accomplishments was the extension of the railway system. The British military engineers constructed a branch line from Ahvaz to Khorramshahr so that the port could be effectively utilized in the aid to Russia program. The severely limited facilities at Bandar Shahpur provided a strong inducement to link Khorramshahr to the Trans-Iranian line. The 75 mile branch line was completed in June 1942. Additionally a 30 mile spur was completed from the new branch line to the port area of Basra in the summer of that year.

In September 1941 the British established as a goal the raising of the daily capacity of the railway to 2,000 tons by April 1942. To meet this ambitious objective the British expanded facilities, particularly at the stations, and improved operation. "They doubled the rolling stock,

including motive power."⁸ During the last five months of their independent operation of the railway the British attained an average daily haulage of 1,500 tons. As remarkable as this achievement was, it fell far short of the new goal of 6,000 tons daily capacity that was set by the Anglo-American Combined Chiefs of Staff in September 1942.

Building upon the base provided by the British, the Military Railway Service continued the improvement of the railway. Virtually new construction was required through the mountains where the light rails, laid to carry only the mild and infrequent little trainloads of prewar times, "crept" under the weight of war tonnages.⁹ New trackage was laid for additional passing sidings, expanded freight and sorting yards, and rail-to-truck transfer tracks at Andimeshk and Tehran. Trackside facilities were increased as were repair and overhaul shops. The number of locomotives increased, and the quantity of rolling stock climbed rapidly. The daily haulage target of 6,000 tons was surpassed for the first time on 3 March 1943 during the transitional period of joint British and American operations. Sustained operations at this level were achieved in 1944 when the daily average for the entire year was above 6,400 tons. In July 1944 the daily average for the month was in excess of 7,500 tons.¹⁰

When the Allies departed, Iran received back a greatly enhanced rail line. Sufficient surplus British and American rolling stock was sold to the Iranian State Railways to accommodate 50,000 long tons of haulage per month. The Allied operation of the railways had also provided the Iranians with considerable training and experience in the efficient management and operation of a railway.

Roads were to play a vital part in the transport of materials to the Soviet Union due to the near inconsequential capacity of the railway in 1941. Even though it was early decided that the railway would be the prime mode of transport, considerable time would be required to increase the rail line's capacity. However, in the interim incoming cargoes would have to be moved to the Soviets. Thus first the British and then the Americans established large trucking services. Yet as none of the several routes from the southern ports to the Soviet reception areas were adequate for sustained heavy usage, extensive programs of road construction and maintenance were necessary.

Four road routes were employed to move war materials to the Soviet reception points. The least used was the road in eastern Iran from Zahedan north to Mashhad. This road continued the movement of supplies which had been landed at Karachi and had been shipped to Zahedan by rail. The 100 mile Iranian extension of the Indian railroad had been rehabilitated for this purpose. A British firm made some improvements to the route. The route was only used intermittently from 1941 to 1943 and was abandoned in 1943 due to bad road conditions and Soviet objections to its use. It is doubtful whether much maintenance was performed on the road after this.

Likewise the road from Bushire to Tehran was not utilized throughout the war. In the early days of the war a truck assembly plant was located there, and the assembled trucks were delivered to the Russians at Tabriz under their own power. Additionally a British firm convoyed cargoes unloaded at the port. However, in July 1943 the truck assembly plant was closed and after that time no Russian-aid cargoes passed through Bushire.¹¹ Three reasons contributed to the abandonment of this

route. Initially the port was at a considerable distance from Tehran thus increasing the time and expense of delivering cargoes. Secondly the port had severe limitations that would have been costly to overcome. Finally the road inland from Bushire was variously described as "execrable" or "one of the worst in Iran."

The two major road routes through the British zone for delivery of Russian-aid cargoes both started at the head of the Persian Gulf and terminated at Qazvin which was the Soviet reception point. The first of these was the long established route from Basra through Baghdad to the Iranian border near Khanaqin. The road proceeded from the border to Kermanshah through Hamadan and thence to Qazvin. A British trucking service employed this route, and, except for the Hamadan-Qazvin section, the British controlled operations and movement on it. At the war's end the entire road had been asphalted.

The second major road route was the much more recently developed road northward out of Khorramshahr. The road initially led to Ahvaz. It then passed through Andimeshk, Khorramabad, Malayer, and on to Hamadan where it linked with the route from Iraq. This was the sole route on which American trucking operated, and the Persian Gulf Command eventually assumed control over operations and movements on the entire route to Qazvin.

Considerable improvements were necessary to put the road in a condition to withstand the intended usage. "No part of the highway to Qazvin in December 1942 was fit for heavy and continuous traffic."¹² An April 1942 directive specified that the American road construction forces were to complete a temporary road and a permanent two-way highway between Khorramshahr and Andimeshk and a branch road to the Basra port

area by 1 December 1942. In December, with the temporary road completed except for surfacing along some sections and the Basra road not yet started, it was decided to concentrate construction on the permanent road. Completion of the all-weather road required the greater part of 1943 as serious floods in March of that year had washed away much of what had been built up to that time.¹³ American engineer troops did not commence work north of Andimeshk until June 1943 because in this region the task was improvement to an existing road. Working with British forces, the construction crews had the road to Qazvin hard surfaced by the end of 1943 except for only 50 miles.¹⁴

Within their zone of occupation the Soviets also carried out road improvements along the supply route. At the war's end a part of the road from Qazvin to Rasht had been asphalted.

At the end of the war it was estimated that Iran possessed about 23,000 miles of road along which motor cars could travel at some season of the year.¹⁵ The Allies had hard surfaced "a total length of just over nine hundred miles."¹⁶ Not more than 5,000 miles were even roughly metalled, often only with stones thrown together and roughly water-bound, but crushed hard by the passage of traffic. Much of the remainder had only a light surfacing of stone or gravel, and sometimes only an improved earthen surface.¹⁷

The expansion of Iran's port facilities was an urgent necessity if the Allied objectives in the aid to Russia effort were to be attained. Shortly after their occupation the British initiated construction at Bandar Shahpur and the Soviets commenced restoring Bandar Shah. Large scale construction at Khorramshahr awaited the arrival of American forces.

At the time of the Russian occupation Bandar Shah had nearly ceased to be a functioning port. The port was located in an area of mud flats and shifting soil where silting is rapid.¹⁸ By 1941 the silting was so bad that the harbor was little used, and the Iranian authorities had abandoned hope of dredging the channel clear. By use of lighters the port could handle not more than 200 tons daily, and the "actual tonnage in 1940 was only 970."¹⁹ Drastic improvements were necessary if the port was to handle the eventual 6,000 tons per day that the British and Americans planned to move over the railroad.

Soviet efforts did greatly upgrade the port's facilities. The Soviets dredged the $7\frac{1}{2}$ mile long approach channel to a depth of 14 feet. They strengthened and repaired the existing jetty which was able to berth four ships and transferred cranes from Bandar Pahlavi. The number of ships that could be berthed at one time was increased by the construction of two new jetties. The first was able to accommodate two ships along a berthing space of 338 feet. The jetty was served by two rail tracks. The second new jetty could accommodate four ships along a berthing space of 538 feet. This jetty was served by four railway tracks. The number of ships that could be berthed was thus raised to ten.

As with the railroad, it was at one time intended that the American command would assume operational control over those ports initially taken over by the British. The Services of Supply Plan as modified and approved by the Combined Chiefs of Staff specified that United States forces would operate five ports in the Persian Corridor: Tanuma in the Basra port area, Khorramshahr, Ahvaz, Bandar Shahpur, and Bushire. However, within

Iran the Americans only completely took over Khorramshahr and Bandar Shahpur. The Persian Gulf Command commenced full operations at Khorramshahr on 7 January 1943 although British units remained to assist. In mid-February a similar transition occurred at Bandar Shahpur. On 1 April 1943 total American operations commenced at both ports.

When the British arrived at Bandar Shahpur the port installations were relatively simple and limited. Its single jetty possessed 800 feet of berthing space, considered adequate for two ocean-going ships. There was also a lighterage wharf situated in a creek which unfortunately was dry at low tide. Many buildings were incomplete, the waterpipes laid to the jetty unconnected to any source, and the buoyage markers and channel lights ill maintained.²⁰ Fresh water, especially in amounts for provisioning ships, was supplied in tank cars by rail from Ahvaz.

In 1942 the British began constructing a second jetty, which was put into operation during June to August 1943. It had 1,200 feet of berthing space for three ships, thus increasing port capacity to five ships. The buoyage system was also improved.

The arrival of American forces signaled the beginning of large scale improvements to many support facilities. The capacity of the water pipeline from an inland creek 40 miles away was increased. Two tidal gates to control the flooding of the mud flats were completed and drainage installed. Most of this work was finished by December 1943.

The Americans also enhanced the port's cargo capacity by improving lighterage facilities. The existing lighterage wharf was abandoned. In its place the American engineers substantially reconstructed and

enlarged an old wharf on the mainland two miles north of the main port area. Provided with two rail spurs from the main line and with sufficient cranes, the wharf was able to discharge cargoes directly from lighters into railway cars. Beginning work in March 1943, the Americans finished the project in October that year.

Khorramshahr experienced the most extensive expansion of Iran's ports. The port's capacity in late 1941 was variously estimated at from 200 to 700 long tons per day.²¹ Early plans specified that the capacity was to be raised to 2,200 long tons per day. American personnel arrived in April 1942 to begin the necessary construction. At this time the main facility was the Sentab Jetty which provided a deep water berth for one ocean-going ship. When the Americans arrived, the jetty was covered by a large pile of coal and was not used for shipping. Khorramshahr was resorted to only when Bandar Shahpur was crowded.

Expansion of Khorramshahr's several landing facilities was undertaken by both British and American forces. The Americans began the expansion of Sentab Jetty in April 1942 to provide two additional berthing spaces. At the end of June the British requested that a third berth be constructed, and later they requested three more. The sixth new berth was completed late in May 1943. Sentab Jetty had thus been converted from a small T-head jetty with a single berth of some 400 feet to a quay measuring 3,251 feet in length able to berth seven ships. The width of the quay had been doubled by April 1944 from the original 50 feet of the pre-war jetty. The quay was served by numerous access railway tracks. An elaborate system of lighting enabled night operations.

During the same period the British expanded two lighterage wharfs

in the port. The more important was that in Failiyah Creek about 1 $\frac{1}{4}$ miles above the Sentab deep-water berths. By May 1943 the wharf had been extended to 1,500 feet in length and was connected to the main rail line by three tracks. This wharf handled the heaviest goods including locomotives and tanks. In 1942-1943 the British also enlarged the lighter-age wharfs at the Custome Jetty and provided it with rail approaches.

The British and American efforts had made Khorramshahr the largest and best equipped of Iran's ports.

Air transport facilities were only marginally improved during the war. This neglect was quite consistent with the aid-to-Russia program of the Allies. Air transport played a highly limited role in the movement of war materials to the Soviet Union. Thus there was no need to improve airfields to any great extent. An aircraft assembly plant was established at Abadan and a large airfield built to support its operations. Otherwise the main air transport activities were the movement of personnel within Iran and through Iran to and from the South Asia theater of war. It was in this connection that the runways at Kerman and Zahedan were paved. The airfield at Abadan had the greatest growth. From a relatively unimproved open field three miles north of the oil company's refinery in early 1942 the airfield became Iran's second largest by the end of the war. Three all weather paved runways were built as well as numerous hangars, shop buildings, and other support buildings.

The operation of the Persian Corridor and the massive Allied presence had without any doubt been beneficial for Iran's transport facilities. Sweeping improvements had been made which would probably have required

Iran decades to accomplish by itself. The improvements to the railroad main line and to the ports most certainly exceeded Iran's near term requirements. However, from a strictly Iranian perspective all of these improvements were concentrated in one small, albeit important, region of the country. The greater part of the country was untouched by the effort. Rather the attention focused in this one area most likely resulted in neglect of others, such as the virtual halt in road maintenance on roads not used in the Persian Corridor.²²

A major question was what would become of the improved facilities. Their construction, operation, and maintenance were the result of large numbers of trained and experienced foreigners drawing upon the vast resources of the industrialized West. Now the foreigners had departed and those vast resources were no longer available. True the Iranians had received considerable training and experience from working with the Allies, and the Allies had left behind some now surplus equipment, but Iran henceforth would have to apportion its own limited resources over the whole of the country's transportation network. Unless large amounts of revenue could be obtained from the country's oil wealth or from foreign loans, it would be extremely difficult to avoid deterioration of the so recently improved facilities.

Notes for Chapter 4

¹T. H. Vail Motter, The Persian Corridor and Aid to Russia (Washington DC, 1952), p. 16.

²Ibid., p. 334.

³Ibid., p. 335.

⁴Ibid., p. 360.

⁵United Kingdom, Admiralty, Naval Intelligence Division, Persia, Geographical Handbook Series (London, 1945), p. 551.

⁶Vail Motter, p. 331.

⁷United Kingdom, p. 551.

⁸Vail Motter, p. 348.

⁹Ibid., p. 368.

¹⁰Ibid., p. 332.

¹¹Ibid., p. 414.

¹²Ibid., p. 312.

¹³Ibid.

¹⁴Ibid., p. 252.

¹⁵United Kingdom, p. 543.

¹⁶Donald N. Wilber, Iran: Past and Present (Princeton, NJ: Princeton University Press, 1948), p. 144.

¹⁷United Kingdom, p. 544.

¹⁸Ibid., p. 510.

¹⁹Ibid.

²⁰Ibid., p. 501.

²¹Vail Motter, p. 83.

²²Plan Organization, Review of the Second Seven Year Plan Program of Iran (Tehran, 1960), p. 40.

Chapter V

In the years immediately following the Second World War Iran's transportation facilities deteriorated to a marked degree. The country was not able to maintain the legacy left it by the wartime Allied construction, and the wartime neglect of areas outside of the Persian Corridor began to take its toll. Thus the surveys of Iran performed by the International Engineering Company in 1947 and Overseas Consultants, Inc. in 1949 dwelled upon the various deficiencies in transport facilities at some length. Indeed in many respects the remarks made in the reports of these surveys are strikingly similar to observations made fifty years earlier. The authors of the International Engineering Company report simply stated: "The country has inadequate communications, including under this term railroads, highways, ports, airfields, telephone, telegraph, and radio. Improvement in communications of all sorts is essential."¹ The Overseas Consultants, Inc. writers highlighted the adverse effects of the situation by noting:

The lack of adequate means of transportation has seriously impeded the economic growth and social integration of Iran. Large cities have grown up in the areas particularly favored by nature, but the commerce and industry of these cities has been largely limited to the immediately surrounding country and interchange of goods between them has been relatively small.²

It was not that the authors of these reports were overly harsh in their evaluations of Iran's transport facilities or that they did not recognize what had been accomplished previously or that the great efforts during Reza Shah's rule and during World War II had been entirely lost. Part of the reason for the severe comments on the transport system

was indeed the serious deterioration the reports documented. However, a greater part of the reason undoubtedly lay with the very nature of the reports and the changed circumstances within which Iran now lived. The reports were written to assist Iran in formulating its first national development plan and thus only naturally would emphasize areas requiring improvement rather than comment on progress already made. Moreover, the standard of development toward which Iran was striving was markedly higher than that which Reza Shah's planners may have had in mind when they considered a first-class road to be a metalled road. The demands levied upon the transport network were also significantly greater than anything previously foreseen. The objectives of the national development plan as recommended by these two American surveys placed requirements upon transport facilities which they were clearly unable to accommodate, thereby highlighting the critical nature of transport deficiencies. The transportation and communications sector thus became a bottleneck which had to be removed so that the country could develop.

In formulating the First Plan the government recognized the requirement for vastly improved transportation facilities by allocating 5 billion rials (\$66.7 million) of the total 21 billion rials in the plan to roads, railways, and airports. This represented nearly one quarter of the plan's allocations. Operation of the plan commenced in 1949 but was soon disrupted by difficulties of finance. The International Bank for Reconstruction and Development (IBRD) did not make a loan, and the Bank Melli Iran could provide only a small proportion of its estimated loan. The nationalization of the oil industry in 1951 resulted in the stoppage of the oil revenues, the remaining source of large scale financing for

the plan. Consequently plan activities were drastically curtailed. Amazingly in 1952, during the oil nationalization economic crisis, the expenditure allocations were raised by 5.3 billion rials. Two billion rials of this amount went to the transportation sector whose portion of the total allocations was thus increased to nearly 27%. Due to the economic crisis this revision had little, if any, impact upon the projects carried out; however, it did demonstrate an increased concern with the transportation network.

By 1949 the deterioration of the railway system had progressed to such a point that its condition, as well as that of the seaports, had become "a matter of imminent and urgent importance." The condition of these two aspects of the transport network was "approaching a point where it may seriously cripple the entire economy of the country and cause unnecessary hardship to its people."³ The deplorable state of the railways arose from several causes.

The most serious cause was the greatly reduced number of the railway's operable locomotives. In 1949 an unacceptably high percentage of both the road and yard locomotives were either in need of repair or beyond repair. Of 207 total road locomotives just slightly more than 50 percent (105) were in service. Of the remainder, 25 road locomotives or nearly an eighth of the total were beyond repair. The situation of the yard locomotives was somewhat better with 30 out of 48 units in service. Still 10 units or over a fifth of the total were beyond repair.⁴ This very high percentage of locomotives out of service was a serious handicap to the railroad's handling of its traffic.

Hard war time usage and the limited sums expended for spare parts

and repair materials generated this situation. The accelerated wear and tear on all aspects of the railway line during the war led to heavy postwar requirements for new track and repairs to rolling stock as well as for new rolling stock.⁵

Yet expenditures for spare parts and repair materials remained quite low. That all such materials had to be purchased from abroad, thus requiring foreign exchange, certainly accounted for this fact. In 1948 some of the surplus British Army rolling stock in Iran that had been sold to the Iranian State Railways at the end of the war remained out of service as spare parts were not yet available.⁶ Because of the paltry purchases the maintenance department was forced to cannibalize parts from some of the locomotives to keep others in operation, causing a steady reduction in the number of serviceable units.⁷

There was some dispute over the extent to which the railway required new rails. The Iranian State Railway officials forcefully maintained that the rails had sustained considerable wear during the war, and unusually heavy expenditures were required for replacements. The International Engineering Company concurred that "a great deal of new rail" was necessary.⁸ The Overseas Consultants railway technicians felt that the need for new rail was exaggerated. Granting that the railroad had carried a fairly heavy volume of traffic during the war, the Overseas Consultants technicians noted that the rail was all fairly new and that their inspection disclosed little distortion or excessive wear. Even the partially worn rails that had to be removed from the main north-south line were considered adequate for use in constructing the line to Mashhad, where, due to the anticipated light traffic, the demand placed upon the rails would be much less.⁹

Most of the railway organization's immediate post-war activity was in construction of the three extensions to the main line which had been terminated by the war. Some of the funds for this construction came from war time claims against the Allies for usage of the railroad. At the time the Overseas Consultants report was written the southeastern extension had been completed from Qum to Kashan but was not yet in operation. It was anticipated this portion of the line would be opened on 22 May 1949. The planned terminus of the southeastern extension was Yazd, and the route from Kashan to Yazd was in various stages of completion. Some work had also been done on the extensions to Tabriz and Mashhad, but the cost estimates of completing these routes were quite high.

Only the completion of the Mashhad extension was encouraged under the First Plan. It was felt that none of the extensions was warranted on a strictly economic basis. The Overseas Consultants noted that:

had these railroads been conceived as profit-making enterprises, it is doubtful whether they would have gone beyond the stage of engineering reconnaissance. In spite of the large amounts which have been spent on them, the remaining amounts required for their completion are somewhat large in comparison with their prospective earnings. As a matter of fact, the line from Kashan to Yazd has no foreseeable prospect of earning anything, and its completion is not recommended at the time.¹⁰

Hence railway construction could only be considered a matter of public policy based on non-economic considerations. Seeking to accommodate this policy but still attain the most effective utilization of the funds available for all transport activities under the Plan, Overseas Consultants recommended that work continue only on the line to Mashhad. Four factors led to this decision: 1) the Mashhad line could be completed in two years;

2) the cost of completing the Mashhad railroad was only half that of completing the railroad to Tabriz; 3) at least three and perhaps four years were required to complete the route to Tabriz; 4) the highway from Tehran to Tabriz could be more easily improved and at half the cost of the highway from Tehran to Mashhad. In any event, with the collapse of the First Plan due to the oil nationalization crisis few funds were available to continue construction.

In spite of the collapse of the First Plan the railway organization was able to make some improvements using other sources of financing available to it. An unspecified amount was obtained from Great Britain for war traffic claims, and in 1953-54 the United States provided a grant of one million dollars for spare parts for rolling stock and equipment for the repair and maintenance of track.¹¹

Deterioration of Iran's road network in the years immediately following the Second World War was extensive and rapid. By 1947 the deterioration had progressed to such an extent that it was impeding the growth and integration of the economy.¹² In early 1948 the primary Persian Corridor highway running from Ahvaz north to Qazvin was badly in need of repair, having many breaks in the asphalt four to six inches deep.¹³ The 1948 report by the British commercial counsellor in Tehran gave the following general evaluation of those roads not asphalted:

Roads which are not asphalted have a surface of stones pressed into sandy soil. The stones work loose with the passage of vehicles and pile up in the center and at the sides, leaving two ruts in which traffic travels, in either direction. Roadmen are employed to redistribute the stones evenly over the road. Elsewhere the surface is firmer but develops transverse ridges about one foot apart, which gives very uncomfortable riding at speeds up to forty miles an hour. Above this speed, the corrugations have a less disturbing effect.¹⁴

The Ministry of Roads and Communications was not unaware of the problem, and repair and reconstruction work was gradually being undertaken. By early 1948 the roads from Tehran to Qazvin and from Tehran to Qum had been remade and asphalted. However, "repair and construction was delayed by a shortage of asphaltting equipment and of road rollers, and it was frequently left to traffic to bed down a newly-made road."¹⁵ Forced to rely upon manual methods of construction and repair, the Ministry of Roads was not able to overcome the backlog of deferred maintenance generated during the war and accomplish current maintenance requirements. Thus by 1949 practically all the roads of Iran required reconstruction or new construction in greater or lesser degree to enable the easy transport of goods and passengers essential to economic development. The Overseas Consultants road engineers deemed no section of road not subject to criticism in some respect. Even the recently constructed and asphalted Tehran-Qum road was faulted for neglect of proper drainage, provision of insufficient embankment in numerous locations, and adherence to the original tortuous alignment.¹⁶

The deterioration of the roads was exacerbated by the increasing demands placed upon them. In the years immediately after the war private sector imports of all types of vehicles rose dramatically.¹⁷ This reflected the increasing dependence of the country on vehicular transport for trade and communications. There was a large demand for heavy-duty trucks capable of carrying heavy loads. These trucks were frequently heavily overloaded. These excessive loads placed a burden upon the roads which they were not able to sustain and accelerated road deterioration. This problem of excessive weight per axle plagued

Iran's planners and the Ministry of Roads for many years and partially accounted for the high costs of road building later encountered.

The road program originally set forth in the First Plan had been drawn up by the International Engineering Company and was both quite extensive and not too well studied prior to its formulation. The plan included 22 separate road projects; however, it was not clear how the roads were selected nor was there evidence of any clear specifications having been established for the road program. A later review by the Plan Organization characterized the program as "an open-ended one of 'digging in the dark.'" ¹⁸ Yet when Overseas Consultants reviewed the list of projects, they concurred with it except for the addition of one short segment. The total road program thus involved 11,462 kilometers with first-class arterial highways having a width of eight meters of which six meters would initially be surfaced with water-bound macadam. It was contemplated that after time for settlement an asphalt surface would be applied. In developing its priority list of road projects Overseas Consultants applied the following criteria: 1) roads connecting resources to centers of consumption, 2) roads connecting seaports to the interior, 3) roads linking major centers not having other means of transport, such as a railroad, and 4) geographical distribution of the road projects.

A major weakness of the original listing of road projects was the cost estimates developed by the Ministry of Roads and Communications. There had been no preliminary engineering to ascertain whether the roads could be constructed for the amounts estimated. Overseas Consultants found that "no surveys had been made of these projects to determine the quantity of earth to be moved or the number or size of bridges." ¹⁹ Conse-

quently based upon a review of the actual costs of similar work and their own judgment, the Overseas Consultants engineers markedly revised upwards the estimates for many of the projects. The increased estimates and the addition of another road segment were accommodated within the overall roads, railways, and airports allocation of 5 billion rials by the recommended deletion of the Kashan to Yazd railway line.

The accuracy of the revised estimates and even the overall feasibility of the entire road program, although highly doubtful, was never demonstrated, as the economic crisis associated with oil nationalization intervened to prevent all but a tiny fraction of the planned new highways from being started. Consequently the condition of the road network continued to deteriorate. Yet the demands placed upon the roads did not diminish. Even though the rate of increase in vehicle registrations slowed during the early 1950s, the total number of registrations rose from 28,200 in 1948 to 40,700 in 1951 and to 64,100 in 1955.²⁰

The economic crisis also inhibited the mechanization of road construction and maintenance activities. Both the International Engineering Company and Overseas Consultants emphasized the importance of obtaining mechanical equipment. Yet in 1953 the Ministry of Roads owned only twenty-one usable pieces of mechanized equipment, mainly rollers.²¹ The resultant dependence upon labor intensive construction, including in some instances forced labor, although providing substantial employment opportunities, tended to be slow and administratively cumbersome.²²

In 1955 construction activities were still dependent upon the availability of skilled and unskilled labor. Unfortunately, in the winter when labor was most readily available, it could be least effectively utilized due to adverse weather. Yet during the summer and autumn when

construction could be carried out at greater speed, only limited labor was readily available as most of it was required for the agricultural harvest.²³

In 1949 Overseas Consultants had identified the seaports as one of the two areas of the transportation sector whose current condition was a matter of imminent and urgent importance. The crisis in the seaports was due to the deterioration that had occurred since the end of the war and the grossly inefficient port administration. In the years after the war a high proportion of Iran's overseas trade passed through Khorramshahr and Bandar Shahpur. Yet in 1947 these ports were characterized as, aside from having docks, being practically undeveloped.²⁴ If not grossly exaggerated, this meant an amazing deterioration of the facilities constructed by the British and Americans during war. Two years later the working capacity of the ports, as then operated, was deemed insufficient to deal with the current trade of approximately 450,000 tons annually.²⁵

By 1949 the port installations generally (except the Customs warehouses), the floating plant and the equipment of the Persian Gulf ports had been neglected. The buoys and lights required urgent attention, and the sea approaches and channels and the port areas needed dredging, in particular at Khorramshahr.

The management and administration of the ports was badly fragmented. Not only were several different agencies involved in the operation of the ports but the functions performed by any one agency differed from port to port and the same function was handled by varying agencies at each of the ports. The lack of unification of control resulted in the

issuance of conflicting orders, friction and general frustration, and overall confusion. In some instances, such as dredging and care of buoys at Khorramshahr, it was not clear who had the responsibility, and in other instances there was duplication of functions and waste of time and money.

Goods moved through Khorramshahr and Bandar Shahpur only slowly and with the greatest of difficulty. In 1949 Khorramshahr was badly congested with cargo, ship discharge was almost at a standstill, and the dispatching of cargo from its ship to the consignee was seriously delayed. During the preceding years there had been numerous complaints about inefficient organization, inadequate equipment, and the difficulty of obtaining road and railroad clearance out of the port. No relief was to be had by diverting vessels to Bandar Shahpur which was incapable of handling them efficiently. Ships were even then waiting to tie-up alongside the jetties.²⁶

The concentration of trade through Khorramshahr and Bandar Shahpur meant the near abandonment of Bandar Abbas and Bushire. Bandar Abbas was idle with its customs warehouses being used for storage. Bushire was almost idle. Greater usage of the port was inhibited by the use of the customs warehouses for storage rather than as transit sheds. The non-use of these ports caused additional transport time and costs for goods moving between the Persian Gulf and the provinces of Fars and Kerman. Such goods traveled to and from the ports at the head of the Gulf via Tehran or Qum rather than to and from the nearest port. The poor condition of the roads inland from the southern ports significantly contributed to their decline.

Because of the economic difficulties in the early 1950s very little was accomplished in overcoming the deficiencies in Iran's ports.

In the development of its air transport facilities Iran was confronted with a need not only to develop rudimentary or largely non-existent facilities in its several major urban centers but also to upgrade its sole international class airport at Mehrabad outside of Tehran. Such upgrading was demanded by the increased size of aircraft in international air transport and the enhanced support facilities required by the newer aircraft. Such enhancements could not long be delayed if Iran was to receive regular international air service. The air field at Abadan, which had been constructed by the Allies during the war, was capable of being upgraded to international class standards. Prior to the start of the Seven Year Development Plan the Department of Civil Aviation had begun improvements at both Mehrabad and Abadan. Continued improvements at these two airfields were expected to be financed from the regular budget of the Department. Funds from the Plan Organization were to be used primarily at Iran's other principal cities which, except for Kerman and Zahedan, continued to lack paved runways and passenger terminals. The disruption of Iran's finances during oil nationalization resulted in very little being accomplished.

After the resolution of the oil nationalization dispute in 1954, the Plan Organization first attempted to salvage something from the plan by drawing up a list of "impact programs" which could be accomplished in the short time remaining in the plan period. It was soon realized though that the Plan Organization had to formulate a new development plan to accommodate the altered situation. Thus the first plan was terminated in September 1955, six months prior to its original completion date.

The Second Seven Year Development Plan underwent a series of modifications and revisions before a final revision was issued in 1959. Throughout all these changes, the communications sector retained a dominant position in the overall anticipated expenditures. That communications and transportation received the largest sectoral allocation testified to the continued inadequacies of nearly all facilities in the sector and the constraining effect the inadequacies were having on the country's development. Still the various projects were not complementary components of an overall, well thought-out and integrated national development plan. Rather

The Second Seven-Year Development Plan, like its predecessor, was but a series of state projects, categorized under four main headings: agriculture and irrigation, communications and telecommunications, industries and mines, and public utilities and services. Each of these headings was divided into sections and for each section an annual expenditure target was proposed. The plan had no overall target other than total expenditure and the general direction imposed upon it by the Plan Act.²⁷

The Second Plan initially entailed the expenditure of 70 billion rials apportioned as shown by Table 2. Within eighteen months of the start of the plan, the Plan Organization obtained Majlis approval for a 20 percent increase so that the total allocation rose to 84 billion rials (\$1,098 million). However, the modified plan was soon disrupted. Significant cost increases, especially in large-scale long gestation projects,²⁸ and the addition of new projects drove the estimated cost of the full plan to somewhat more than 113 billion rials. However, the government twice reduced the funds the Plan Organization was to receive from oil revenues, the major source of financing for the plan.

The Plan Organization was forced to undertake a complete reappraisal of the Second Plan in 1958 and to perform substantial reprogramming for

the last half of the plan period. The Revised Second Seven Year Development Plan envisioned total expenditures of 87.2 billion rials (\$1,477 million) apportioned as shown in Table 2. The communications sector enjoyed a substantial increase in overall funding from 22.8 billion rials (\$298.0 million) to 30.4 billion rials (\$397.4 million) and its dominance in the total plan increased from 32.6 percent to 34.8 percent of total funds. The continued pre-eminence of the communications sector reflected the desire of the planners to overcome what was considered an emergency in the nation's transport facilities.

Because so little had been accomplished during the First Plan period, in 1955 Iran's transport and communication system was still woefully inadequate to meet the country's needs. Many of the overall observations made at the beginning of the First Plan continued to be valid. The major highway system had not kept pace with the demands levied by the increasing number, speed, and size of vehicles. The road and rail routes to Europe were either closed or inadequate thus placing a heavy burden on ocean transport via the Persian Gulf for foreign trade. The port facilities required repair and enlargement and the port administration was fragmented and inefficient. Facilities at Tehran airport needed improvement and extension so that Iran could have an airport able to accommodate international air carriers. In its review of the Second Seven Year Development Plan the Plan Organization summarized the situation by stating "in short, obvious and severe bottlenecks in Iran's transportation and communication system were limiting the level of trade and commerce, causing distortions in marketing and prices, increasing costs and the price level, and restricting economic opportunities and growth."²⁹

Just as the overall Second Plan was not a fully integrated national development plan, so too the various projects in the transportation sector lacked a well thought out and coherent framework. "The transportation . . . programs were developed without much consideration of alternative means for most effectively meeting the country's transport . . . requirements. . . . No attempt was first made to determine the total transport needs . . . and then design a rational and integrated program to meet current and future needs."³⁰ Rather the composition of programs and projects in the Second Plan was to a great extent shaped by the uncompleted programs of the First Plan. Programs under implementation at the start of the plan claimed approximately a quarter of the funds originally allocated to the transport and communications sector. The needs and requests of the ministries and the analysis and recommendations of Overseas Consultants, Inc. further played major roles in determining the composition of the sector's program. The distribution of allocations within the communications and telecommunications sector was as shown in Table 3.

Apparently the prime objective within the transport sector was to meet the various emergency needs of the transport infrastructure. The lack of a total integrated transportation plan was perhaps not too serious in 1955 as the immediate needs in the different sub-sectors were real and obvious. Hence the transport program was primarily formulated to repair and develop existing facilities to meet current demands.³¹

During the first two to three years of the plan many of the projects in the communications sector encountered significant cost increases, most especially in road construction. From accounting for slightly less than

half of the communications sector's original allocation, the road construction program, if unaltered in scope, would have increased to 60 percent its share of the sector's allocation. These cost increases were forcing the diversion of funds from other sub-sectors of the communications sector and the other sectors to roads. This and the general cost increases and the reduction of oil revenues set aside for the plan resulted in the significantly revised Second Plan being drawn up whose allocations within the communications sector were as shown in Table 3.

The allocation of funds within the communications sector testified to a greatly enhanced emphasis upon road construction. Even in the original plan the roads sub-sector had dominated the sector program with 10.6 billion rials representing nearly half of the sector's total funds. Now roads construction would receive 18.5 billion rials or three-fifths of the sector's funds. This sub-sector very nearly dominated the entire plan with only the agriculture and irrigation sector slightly exceeding it in size with 21.7 percent of total plan allocations. Even though the monies allocated to communications increased by 7.6 billion rials, it was not sufficient to cover the 75 percent increase in road construction monies, especially as allocations to ports and airports also increased. Railroads and the other sub-sectors of communications as well as the industry and mines sector lost funds to roads construction. Evidently Iran's planners were convinced that transportation had to be improved before progress could continue in other areas.

Railroad construction and improvement received second priority within the communications sector. In the original plan railroads were

to receive 6.2 billion rials representing over a quarter of the sector's allocations and nine percent of the total plan. Completion of the Tabriz-Mashhad route dominated the sub-sector program with 45 percent of its funds. In the Revised Second Plan the funds allocated to railroads declined to 5.4 billion rials entailing a sharp decrease in the sub-sector's share of the overall communications program. Significant enhancement of the railway system beyond completing the Tabriz-Mashhad route was delayed to release funds for needed improvements in the highway system.

As the remaining construction on the Tabriz-Mashhad route was already well defined and largely engineered and as the work was conducted through more easily administered large individual contracts, the work commenced quickly. In January 1957 the first train arrived at Mashhad from Tehran, and in May 1957 the line went into full operation. The line from Tehran to Tabriz was opened in April 1958. Just over three billion rials were spent in completing the route, a considerable increase over the 1949 cost estimate of 1.785 billion rials. Still the total costs of completion were roughly the same as the original estimate in real terms.³² In October 1960 a short spur of the main north-south line was opened from Bandar Shah to Gorgan. Employing its own resources the Iranian State Railways authority (ISR) continued building the uneconomic line from Kashan to Yazd. By the end of the plan period 90% of the roadbed had been completed and track laid some 60 kilometers to Bad.

Employing both Plan Organization development funds and other sources of revenue the ISR carried out several capital improvements projects and improved the in-service rate of its equipment. The Export-Import Bank

in 1956 provided a loan of \$53 million for dieselization of the locomotives, and American and French firms extended supplier credits for the purchase of rails in a track replacement program. These programs were nearly completed by the end of 1961. By that time the annual proportion of equipment requiring repairs had been reduced to approximately 20 percent.³³

The expansion and improvements to the railways certainly enabled the substantial increase in freight and passenger traffic and gross receipts that occurred between 1949 and 1960. During those years freight haulage grew from 756 million ton-kilometers to 2,145 million, passenger traffic from 324 million passenger-kilometers to 1,550 million, and gross receipts from 1.053 billion rials to 3.805 billion. Even so it was doubted whether total receipts were adequate to cover both operating expenses and capital costs.³⁴

The railway's attaining a healthy financial condition was hindered by several factors. At one time oil haulage accounted for over 60 percent of the railroad's revenues; however, the transport of oil products was gradually transferred to cross-country pipelines whose capacity substantially increased after the mid-1950s so that by 1960 oil haulage contributed only 40 percent of the railway revenues. The railway was also encountering stiff competition and loss of freight to the rapidly expanding trucking industry. The trucking industry was encouraged by the heavy investment in road construction, particularly as some of the major roads built duplicated the railroad routes. Furthermore in 1962 the ISR was heavily overstaffed, and freight and passenger rates remained low and inflexible. Consequently the railways continued to be a drain on the government budget.³⁵

The road construction program as originally specified in the Second Plan was quite ambitious in its scope and, as was soon realized, overly optimistic both as to construction costs and the ability of the country to execute. Thus the program underwent a series of modifications which drastically curtailed its scope; however, the large reduction in the number of roads to be built did not prevent total costs from rising substantially. In its review of the Second Plan the Plan Organization attributed the increased construction costs primarily to

- (1) increased labor, materials and equipment costs, (2) increased specifications as to width (11 meters) and asphaltting (7.8 meters), (3) increased specifications as to weight bearing strength of the major highways (13 tons per axle), and (4) consultants fees.³⁶

The original program envisioned the construction and reconstruction of 10,700 kilometers of roads. The program continued to be based upon the Overseas Consultants Inc. recommendations of 1949 and thus emphasized the rehabilitation of Iran's major highways. The Ministry of Roads was to oversee the construction of 4,700 kilometers, and the Plan Organization retained responsibility for the remaining 6,000 kilometers. A British consulting firm was retained to perform the necessary planning and supervision of actual construction for the Plan Organization's share. The road program consisted largely of the upgrading of gravel roads to asphalt.

Numerous difficulties soon made it evident that the initial program was unrealistic. Sufficient skilled manpower and equipment were not available to fully implement the program.³⁷ On the whole, contractors and laborers gained their experience as the work proceeded thereby making progress very slow initially.³⁸ To increase the quantity of

road building equipment the Plan Organization started to advance capital on newly signed construction contracts to enable the contractors to purchase equipment. Thus the percentage of machinery and equipment costs in the total cost of road construction showed a marked increase. However, there was considerable "over-investment" in equipment by a multiplicity of contractors.³⁹ The changes in specifications and the general increase in labor wages and costs of materials greatly increased total costs. Moreover, many contractors frequently submitted unrealistically low bids to obtain the contract. Thus later the Plan Organization was forced to advance further funds to complete the work.

To accommodate the cost increases the project was gradually cut back in size. The Plan Organization first of all reduced the contract with the British engineering firm to 2,500 kilometers but awarded another 1,100 kilometers to the Kampsax engineering firm. The contract with the British firm was terminated in March, 1958 due to continued difficulties. Shortly afterwards the Plan Organization's portion of the total road program was further reduced from 3,600 kilometers to 2,470 kilometers. That part of the Plan Organization's portion not included in the Kampsax contract was allotted to two foreign consulting firms and a joint Iranian-French company for design and execution. The routes selected for construction and reconstruction were predominantly the major highways of the country. Over half of the program was committed to reconstructing the Trans-Iranian Highway between Khorramshahr and Bandar Pahlavi and constructing a link from Bandar Shahpur to the highway at Ahvaz. Other important routes ran from Hamadan through Kermanshah to the Iraqi border at Khrosravi and from the Tehran region across the Alburz

mountains to Babol in the Caspian lowlands. The inclusion of the Trans-Iranian Highway in the program is at minimum open to serious question. The route had been specifically excluded in the Overseas Consultants recommendations as it duplicated the route of the Trans-Iranian Railway in its southern portion. Moreover, as the preponderant share of goods moving out of the ports of Khorramshahr and Bandar Shahpur was destined for Tehran, the greater part of the traffic would proceed north on the highway to Qazvin and there turn off toward Tehran. Upgrading the Trans-Iranian Highway thus stimulated competition to the railway and undercut any benefits to be derived from railway developments. It seems that, given the limited available funds and the requirements for road improvements elsewhere, the monies could have been more effectively utilized in other areas.

While the Plan Organization share of the road program was being drastically curtailed, that of the Ministry of Roads had also been reduced. Using both Plan Organization and regular budget funds, the Ministry was responsible for the development of some 3,670 kilometers of primarily major highways. Additionally the Ministry launched a program to maintain approximately 8,000 kilometers of roads with equipment purchased by a \$17 million loan from the Export-Import Bank. The U.S. bureau of Public Roads assisted the maintenance program under an agreement intended to insure effective utilization of the equipment and further development of the Ministry.

By the end of the plan period in September 1962 the length of asphalted roads had increased substantially from an estimated 500 kilometers in 1957⁴⁰ to approximately 4,300 kilometers. The road system

further included approximately 13,300 kilometers of all-weather gravel roads and some 9,600 kilometers of other main roads.⁴¹

Despite its size the original road program concentrated only upon the major national highways and some of the more important provincial roads. No provision was made for nor funds allocated to developing "feeder" roads to provide access from Iran's numerous small villages (some 50,000) to the major or "trunk" routes. The successive reductions in the road program further concentrated efforts upon the major national highways and left few funds for even provincial roads. Yet the importance of feeder roads to the total development effort was not unrecognized. The Plan Organization realized such roads were necessary "to enable villages to bring their products to market at reduced costs, to encourage the expanded use of productive resources, and to enable health, agricultural extension and social services to reach the villages."⁴² Thus in the revised Second Plan 250 million rials were allocated to begin the development of such roads.

The funds were to be employed in a cooperative effort of the Ministries of Interior, Roads, Agriculture, Industries and Mines, and the Plan Organization. The Ministry of Interior was to direct the overall program utilizing funds and technical assistance from both the Plan Organization and United States Operations Mission. Road construction costs were to be borne equally between the village and the government. An important purpose of the program was to provide the organization and technical skills whose absence had so frustrated earlier efforts at developing village roads.⁴³

Because of the paucity of port improvements during the First Plan the condition of the ports at the beginning of the Second Plan were at best no worse than they had been in 1949. Port facilities continued in a state of disrepair, and port administration remained archaic and

fragmented thereby hindering the expeditious transfer of cargo from the ships to inland transport facilities. The unavoidable consequence was serious port congestion which had continued for many years. Congestion became a virtual emergency in the fall of 1958 when ships had to wait as long as forty days for a berth.

In the original Second Plan nearly eleven percent of the communications sector's funds or about 2.5 billion rials (\$32.7 million) were designated for port improvement and expansion. In 1955 the port facilities were estimated to be able to handle slightly less than one million tons annually with their current administrative practices. The initial port program envisioned increasing the total capacity to 1.85 million tons annually without any improvements in administration. The major aspects of the program were (1) necessary repairs to existing facilities at Bandar Pahlavi, Khorramshahr, Bandar Shahpur, and Bushire, (2) expanding facilities at Khorramshahr and Bandar Shahpur, and (3) building a new deep-water port at Bandar Abbas. Enhancement of Khorramshahr and Bandar Shahpur was critical because these two ports handled the greater part of Iran's trade. "Between 1947 and 1957 an average of 72 percent of imports by value passed through the Gulf-head ports."⁴⁴ Improvements at Bushire and particularly the new port at Bandar Abbas were intended to shift some of the current and anticipated foreign trade away from the Gulf-head ports and to provide more convenient access to the southern regions of the country.

Increases in costs well beyond the original estimates obviated completion of the full program. Even though the revised plan increased the monies allotted to the port program to nearly 2.9 billion rials, the

funds were still insufficient to cover the rising costs. It was decided to defer construction of the new port at Bandar Abbas into the Third Plan; however, the construction plans were still to be completed to the point of tender documents as Iran's planners continued to believe the new port was fully justified. The remaining portions of the port program were finished, thereby increasing total port capacity to 1.9 million tons annually. Khorramshahr with 970 thousand tons capacity and Bandar Shapur with 600 thousand tons accounted for four-fifths of total capacity;⁴⁵ that of Bandar Pahlavi was tripled to 150 thousand tons.

Yet this significantly enlarged capacity was not considered sufficient to accommodate the anticipated growth of foreign trade in the near term. Inefficient port administration was causing a great underutilization of the ports' physical facilities. In its review of the Second Plan in 1960 the Plan Organization asserted "that the facilities currently in place and planned for completion by 1962 (even excluding any development at Bandar Abbas) can, under reasonably efficient administration, achieve an effective working capacity of at least 2.0 million tons and probably as high as 2.6 million tons annually."⁴⁶ Some improvement was made when, acting upon an IBRD recommendation for a unified port administration, all the authority of the various ministries dealing with port matters was transferred to the Ministry of Customs and Monopolies and a central port administration was formed within the ministry. However, Iran's planners were convinced that a truly independent port authority separate from the customs function had to be established before the country could be assured of a port administration that would make the most effective use of the physical port facilities and that would aid rather than hinder the nation's economic development.⁴⁷

In 1955 Iran's air transport facilities continued to require extensive upgrading. The airfields at Tabriz, Mashhad, Isfahan, Shiraz, Ahvaz, and Bandar Abbas lacked paved runways and terminal buildings. Mehrabad with its single long concrete runway remained Iran's only international class airport even though some international flights did go into Abadan. Still even Mehrabad required considerable upgrading to meet the increasing demands of international air travel. In spite of the lack of fully modern facilities, air transport had continued to grow. In 1953 Iranair had carried 12,000 passengers and 80 tons of freight in domestic flights, and in 1954 16,000 passengers had passed through Mehrabad on international flights.⁴⁸

The initial Second Seven Year Plan provided approximately 1.4 billion rials or about six percent of the communications sector's funds to the development of airports in an apparently balanced program. Not only was Mehrabad to be extensively improved but substantial funds were allocated to upgrade five other major airports and fifteen second class fields. However, considerable changes had occurred in the distribution of funds by the time the Revised Second Plan increased the monies for airports to 2.1 billion rials or slightly less than seven percent of the sector total. Escalating costs due to low initial estimates and revised specifications to accommodate technological advances in international air transport resulted in over one-half of all airport appropriations being allotted to Mehrabad. The plans for construction at fifteen second class airfields were drastically curtailed. The only other airports to receive substantial sums were Abadan, Isfahan, and Shiraz. Yet in its preparations for the Third Plan, the Plan Organization averred that even the heavy expenditures on the four main airports had not provided the facilities

required to serve those cities properly.⁴⁹ This supposed lack of adequate facilities apparently did not too greatly impede continued growth of air transport as in 1964 international traffic had increased sharply to 190,000 passengers and in 1963 domestic traffic had reached 120,000 passengers and 470 tons of freight.⁵⁰

The Third National Development Plan which extended for $5\frac{1}{2}$ years from September 1962 to March 1968 differed in important respects from its predecessors. Initially it was more comprehensive than the first two plans and was more nearly a true national development plan. A primary goal of an annual six percent growth in GNP and several subsidiary goals were set for the economy as a whole, and sectoral allocations and specific programs were derived from the overall goals. Secondly there seemed to be a more balanced allocation of funds amongst the four broad categories that had been used in the initial plans. Throughout the different versions of the plan no one broad sector dominated so completely as had communications and transport in the Second Plan, and in none of the versions of the plan was communications and transport the single largest sector. The more balanced nature of the allocations most likely reflected both an assessment that the main defects in the transport facilities had been overcome and the need to accelerate development in other sectors of the economy and society. Nevertheless, that the communications sector continued to receive approximately 25 percent of the total allocations testified to the fact that much remained to be accomplished. The specific sectoral allocations and their share in each of the revisions are given in Table 4.

Further development and especially extension of the railway system

was given a lower priority in the Third Plan. Allocations to the railways declined to 4.3 billion rials. When the plan was initially formulated, the only significant extension was a link from Tabriz to the Turkish railway system at Ghotur. Iran had concurred in this CENMO sponsored and USAID financed project during the Second Plan period and had completed only 60 kilometers of the road bed. The extension required the construction of 139 kilometers of new rail line from Sharafkhaneh on Lake Reza'iyeh to Ghotur. The already existing Tabriz to Julfa rail line with its branch from Sofian to Sharafkhaneh had only to be improved to complete the link with the Turkish rail system. Other portions of the railway program provided for the purchase of additional rolling stock, improvement and reconstruction of sections of the existing rail system, and construction of various support installations.

The agreement with the Soviet Union in January 1966 for the construction of a large steel mill near Isfahan prompted construction of additional rail lines. Work was resumed on the line from Kashan to Yazd and some 1,550 kilometers of new line were incorporated into the Third Plan program to link Isfahan with the Kashan to Yazd line and the steel mill with the iron and coal mines in the Bafgh and Kerman areas. The line to Isfahan was to depart from the Kashan-Yazd route at Bad. The rail line from the steel mill, which was linked to Isfahan, joined the Kashan-Yazd route above Yazd and then proceeded southeastward to Bafgh and Zarand.

Due to the reduced level of railway funding work progressed slowly on these various projects. Nearly all of the railway foundations on the extension to Ghotur had been finished but only half of the track had been

laid by the end of the plan period. The newly planned work on the route to Yazd and the rail lines to Isfahan and in support of the steel mill had only commenced with but 20 percent of the foundations laid. Not until 1967-1968 was there a significant increase in the imports of rail tracks and rolling stock.⁵¹

Again during the Third Plan road construction was the largest single subsector within the communications sector with a greater emphasis being placed upon the development of feeder roads. Initially the Plan Organization intended to construct a minimum of 10,000 kilometers of these dirt and gravel routes to connect both villages and underdeveloped resource areas to the main roads and highways.⁵² However, this was altered so that, in addition to a full study of the country's requirements, projects would be prepared for 10,000 kilometers of gravel roads and 7,000 kilometers constructed. During the plan period over 14,500 kilometers of feeder routes were surveyed, and nearly 5,500 kilometers built with work in progress on approximately 3,300 kilometers at the end of the plan.⁵³ Additionally just over 9,000 kilometers of gravel roads were built; however, this figure included those gravel roads built as part of the feeder road program. As regards the building of asphalted highways, the initial priority was completion of the Plan Organization's portion of the Second Seven Year Plan's road program involving the asphaltting of 1,250 kilometers. New Third Plan activities included twenty new asphalted roads and a limited asphaltting of gravel roads. Approximately 3,900 kilometers of asphalted roads were completed during the Third Plan raising the total of such roads to a little more than 8,100 kilometers. At the end of the plan Iran possessed approximately 30,500 kilometers of all-weather roads

including more than 22,000 kilometers of gravel roads.⁵⁴

Even though this represented a considerable improvement over the situation in the late 1940s, the entire road network, even including some 4,600 kilometers of dirt roads, still represented extremely poor communications facilities on an international comparison when considered in relation to either total population or land area.⁵⁵ Indeed, a preliminary survey made in the latter part of the plan period indicated a requirement for 100,000 kilometers of major and feeder roads.⁵⁶

The prime objectives of the Third Plan in the ports sub-sector were continued expansion of the physical facilities and improving utilization of the existing installations through more efficient administration and better maintenance. The single largest project was the construction of a deepwater port and related facilities near Bandar Abbas, which at the beginning of the plan had a capacity of 75 thousand tons per annum. Construction commenced in 1963 assisted by a \$15 million loan at three percent interest from the U.S. Agency for International Development for the foreign exchange costs of goods and services required for the project.⁵⁷ When completed in 1968, the new port had a capacity of 1.5 million tons per annum consisting of 900 thousand tons for general commercial cargo and 600 thousand tons for the export of ores. However, the port failed to become one of Iran's major commercial ports as was intended. Just after its completion the port was receiving less than 60 thousand tons annually of general cargo⁵⁸ and in 1970 its total capacity was being only 17 percent utilized.⁵⁹ Numerous factors contributed to this condition including no telephone communication with the port city (let alone the hinterland), few experienced pilots, and slow loading and unloading due

to a lack of qualified operators to work the forklifts.⁶⁰ Bandar Abbas was also at a great disadvantage compared with the Gulf-head ports because of its much farther distance from Tehran which remained the largest market in Iran. The prime value of the port would have to be as part of a larger scheme to develop the southern regions of the country.

Large scale expansion projects were also executed at Iran's other major ports except for Khorramshahr whose capacity remained at 970 thousand tons annually. The government remained desirous of shifting traffic away from Khorramshahr and to ports closer to the cargo's ultimate destination such as to Bushire for the Isfahan and Shiraz regions. Furthermore Khorramshahr remained vulnerable to Iraqi interference. Thus in 1965 the government concluded agreements with Dutch, Swedish and German firms for reconstruction of Bushire's port which when finished nearly tripled its capacity to 200 thousand tons annually. Bandar Shahpur was expanded and equipped for the export of 400 thousand tons of ores thus raising its total capacity to one million tons per year. Additionally at the end of the plan period construction of a ship repair dock had considerably progressed. Finally capacity at Bandar Pahlavi was increased to 250 thousand tons. Overall the total capacity of Iran's port facilities more than doubled to nearly four million tons per year.⁶¹

Yet the impressive expansions in physical facilities were greatly undermined by continued weaknesses in port administration and maintenance. "No success had been achieved during the plan period in improving the operation and maintenance of existing facilities. . . ."⁶² Iran's planners considered that the ports had become a real bottleneck in the country's

communications program during the Third Plan due to organizational weaknesses, the shortage of technical manpower, and overlapping functions of various agencies in port operations.⁶³ Various teams from the United Nations and World Bank estimated that the major ports were functioning at less than 50 percent capacity with disorganized cargo-handling facilities being the main cause.⁶⁴ Further, maintenance of facilities had not been conducted in accordance with a clearly defined program. During the plan period several studies had been made into reorganizing the ports and establishing a better delineation of functions amongst the concerned agencies, but no definitive action had been taken.

Development of air transport facilities continued at a quickened pace during the Third Plan with allocations to the sub-sector being increased by about one-half above those of the Second Plan. Improvements continued at Mehrabad, Abadan, Isfahan, and Shiraz all of which plus the airport at Bandar Abbas were rated as international airports by the end of the 1960s. Enhancements were also undertaken at twelve other airports to equip them as first-class domestic airports. Although full completion of the improvements at several airports had to be continued into the Fourth Plan, by the end of the 1960s Iran had ten first-class domestic airports including Tabriz, Mashhad, Ahvaz, Kerman, Rasht, and Yazd.⁶⁵ This expansion of facilities certainly helped to sustain the 23 percent average annual increase in domestic air traffic that occurred during the plan period and that resulted in Iranair's carrying 366,000 passengers and 1,750 tons of freight domestically in 1968.⁶⁶ However, the operation of the airports was not completely satisfactory. The Plan Organization complained of an inadequacy of specialist technical staff

in the organization of the Department-General of Civil Aviation and of the difficulty of obtaining urgently required repairs and spare parts for flight control communications systems. These factors and the lack of a maintenance program for runways, airport buildings, and equipment resulted in the improper operation and maintenance of the airports.⁶⁷

Like its predecessor, the Fourth National Development Plan, which ran from March 1968 to March 1973, was comprehensive in its approach to the country's social and economic development. The basic economic goal was to increase the GNP during the five years of the plan by 57 percent, an average annual increase of about nine percent. In the initial plan the Plan Organization was to provide 480 billion rials (\$6.358 billion) or nearly 60 percent of the estimated Gross Fixed Capital Formation necessary to attain the stated growth targets. However, as with the previous plans, the Fourth Plan was soon modified upward. Within two and a half years total authorizations were increased to 521.7 billion rials "mainly because of cost overruns in major projects."⁶⁸ Then in the latter stages of the plan the approved credits were raised to 554.5 billion rials (\$7.344 billion). However, at the end of the plan actual disbursements amounted to 506.8 billion rials (\$6.713 billion) or 91.4 percent of the planned allocations.

As indicated in Table 6, the emphasis in Iran's development plan had definitely shifted to industrialization. The various improvements of the Second and Third Plans had ameliorated the most serious deficiencies in the transportation system and significantly expanded its capacity. Thus transport facilities were less of a bottleneck in the nation's economic activities, and resources could be diverted to other areas of

development. Even within the communications and telecommunications sector there was a noticeable shift of emphasis away from transportation. In the earlier plans the monies designated for telecommunications formed only a small portion of the sector's overall program. In the Fourth Plan telecommunications comprised over a third of the sector's program. However, that transportation continued to receive some 15 percent of the total plan's allocations witnessed to the fact that much remained to be accomplished and that further expansion of the transport system's capacity was necessary to accommodate the planned and anticipated economic growth.

In the railway sub-sector no new extensions to the rail network were undertaken. Rather the major construction projects were the completion of the link with the Turkish rail system at Ghotur and of the 1,550 kilometers of main and branch lines to support the Isfahan steel mill. Both of these projects encountered significant cost increases and fell considerably behind schedule. The link with the Turkish railways was opened in September 1971, and the rail line from the steel mill to Zarand was completed by 1973. The railway between Sofian and Julfa was to be reconstructed to improve the link with the Soviet rail system. This project built upon the CENTO-sponsored Turkish link which involved the improvement of the line from Sofian south to Tabriz. Otherwise monies continued to be set aside for the replacement of old track and the acquisition of additional rolling stock and other required equipment. Surveys were also to be undertaken for the later extension of the rail system from Kerman to Zahedan and from Kerman to Bandar Abbas. By the end of the plan the rail system contained 4,519 kilometers of track.⁶⁹

At the beginning of the Fourth Plan the management and operation of the railways was criticized on several points. The rates for passengers and freight were fixed and only rarely responded to seasonal changes and economic trends thus inhibiting the railway's ability to compete with other modes of transport. The attractiveness of rail transport was diminished by excessive red tape, delays, and a lack of freight insurance facilities. A lack of coordination between the railways and the port authorities concerning the transport of government goods frequently meant that large numbers of rail cars waited at the docks for incoming cargo or such cargo was delayed pending the arrival of rail cars.⁷⁰ In a survey in 1970 the IBRD observed:

the Iranian State Railway is wholly state-owned and managed and it relies on the government for the bulk of its financing and traffic. The company operates in an atmosphere of confused authority, inadequate coordination, unclear priorities, surplus personnel, and a pricing policy noticeable for the plethora of special treatment given to government agencies and personnel. These factors have resulted in poor productivity, management, and financial insolvency. The true financial situation of the ISR is unknown because its accounting system is practically non-existent, but there is no question that the ISR is almost wholly dependent on government traffic and subsidies. . . . The ISR as presently constituted and managed is incapable of doing more than act as a drain on budgetary funds.⁷¹

One observer estimated the railway spent eleven rials for every four rials of income.⁷²

During the Fourth Plan the road network received over half of the allocations designated for the transportation system of which the greater part went to the major or trunk routes. The initial effort was to complete 471 kilometers of asphalt construction begun during the Third Plan of which 200 kilometers were financed by Third Plan monies and 3,283 kilometers of feeder roads also begun in the previous plan. As for new projects, the

plan envisioned constructing 4,700 kilometers of new asphalt roads, repairing and asphaltting 2,785 kilometers of existing roads, and resurfacing 1,715 kilometers. However, an early sizable reduction in funds for major road projects together with inadequate preparation and delays in execution soon made it evident the plan targets would not be attained. The Plan Organization therefore revised its objectives downward to completing 2,600 kilometers and having another 2,000 kilometers of major roads under construction by the end of the plan.⁷³ Nevertheless over 4,000 kilometers of newly asphalted roads must have been completed to bring the total length of such roads at the end of the Fourth Plan to some 12,500 kilometers.⁷⁴

Unlike the major roads program, the emphasis accorded to enhancing the network of feeder roads increased during the plan period. When the funds allocated to major roads were reduced, the funds set aside for feeder roads were increased by approximately a third. In addition to completing those feeder roads started in the previous plan, the objective of the plan was the construction of another 12,500 kilometers. Of this figure 10,000 kilometers were to be gravel routes and 2,500 rural dirt roads. However, by mid-way through the plan the feeder road program had fallen considerably behind schedule "mainly due to inadequate preparation and design, cost overruns, and delays in construction because of shortage of funds." Consequently the objective was scaled back to constructing 7,000 kilometers.⁷⁵ In 1972 the completed feeder roads totalled some 12,000 kilometers, "a figure still far too low in relation to the country's vast size."⁷⁶

The Fourth Plan further evidenced an awareness of the importance of

regular maintenance of the road network in that development funds were set aside for the purchase of maintenance equipment. The Plan Organization also encouraged specific policies upon the Ministry of Roads and Communications so that a comprehensive program of scheduled maintenance could be drawn up and executed. The acute need for improved maintenance was forcefully stated by an IBRD survey team in late 1970 when it observed:

The precise condition of the network is not known, but maintenance is generally poor. In 1968 a study of part of the paved road system recommended the expenditure of some \$40 million to improve and maintain that part of the network. Basic data on the highway network are lacking. . . . Traffic on the network (number of vehicles) is estimated to be growing at between 5-7 percent per annum, and highway use (number of trips) . . . at 10 percent per annum. However, the highway maintenance budget has been growing at about 4 percent per annum and maintenance expenditure per kilometer is about half of what is considered appropriate. . . . Unless maintenance expenditure is considerably increased, the existing network, far from increasing, will deteriorate.⁷⁷

The prime objective in the ports sub-sector was a 75 percent expansion of the country's total port capacity from approximately four million tons per year to seven million tons annually. This additional capacity was to be attained through superior utilization of the existing facilities by purchasing additional equipment and by more efficient functioning of the Ports and Navigation Organization and through further physical expansions at several of the ports. Provisions were also made for the construction of a new Caspian Sea port on the Gulf of Gorgan on the south-east Caspian coast should increases in trade with and through the Soviet Union warrant it. At this time approximately 14 percent of Iran's sea-borne trade passed through the Caspian ports of Bandar Pahlavi and Nowshahr. Additionally four smaller ports and fishing ports at Bushire and Bandar Abbas were included in the program.

Early in the plan period the total port allocations were reduced by approximately 15%, and the composition of the projects markedly altered. Construction of a new port on the Caspian was dropped, and the allocations for Bandar Abbas were drastically curtailed to less than 20 percent of the original amount and shifted to the construction of a naval repair yard and dry dock. At Bandar Shahpur work on a new four-berth jetty and other facilities was slow in commencing with the result that the expansions were not completed by the end of the plan. A similar lack of progress after two years occurred at Bushire whose allocations nevertheless were nearly quadrupled. Allocations for expansions at Bandar Pahlavi and Nowshahr were more than doubled. Work at none of these ports was fully finished at the end of the plan. After more than two years nothing had been spent on the purchase of equipment and the allocation nearly halved. Finally the building and rehabilitation of the small ports in the Gulf was nearly eliminated from the plan, as its funds were slashed by more than 90 percent.⁷⁸ As a consequence of the slow progress and the various cutbacks, port expansion fell considerably short of the planned goal and attained a capacity of 4.9 million tons per year.⁷⁹

Airport development had originally received the smallest proportion of the allocations to the four segments of the transport system; however, with a 50 percent increase in the first revision to the Fourth Plan the airport sub-sector surpassed the ports sub-sector in allocations. The plan entailed construction at seventeen airfields, eleven of which were carried forward from the Third Plan. Of the six new construction projects four were for small airports so as to further expand the domestic air

network. A second international airport was also planned for both Tehran and Isfahan; however, the second Isfahan airport was soon postponed due to doubts concerning the need for it and the new Tehran airport was evidently not started during the plan period. The plan also included a major effort to provide equipment and technical assistance to improve the efficiency and safety of the airport system.

In each of Iran's national development plans up to 1973 the communications and telecommunications sector had consistently been accorded a high priority and had received a considerable portion of the total plan allocations. In the first three development plans this sector received over a quarter of the allocations; indeed the sector dominated the Second Seven Year Plan with its allocations rising to over a third of the plan total in the Revised Second Seven Year Plan. Even in the Fourth National Development Plan when the emphasis shifted to industrial development, the sector still received more than a fifth of the total allocations. Within the communications and telecommunications sector transportation facilities received the preponderant share of the funds. It was only in the Fourth Plan that the telecommunications' share of the sector increased markedly. Improvement and expansion of the road system was the most favored of the transport programs with this subsector having more than half of the full sector's allocations in the Revised Second Plan and the Third Plan. This consistently high priority for transportation testified both to Iran's dire need for greatly expanded transport facilities and to the government's determination to meet those needs.

The sustained efforts during the four plan periods had produced considerable physical expansion and improvement in the different portions of the country's transportation network. Even though the total accomplishment over the four plan periods was extensive, the progress within each of the plans generally fell short of initial expectations. Most often the plans set forth ambitious goals, in the case of road construction at times grandiose goals. Then typically costs would escalate considerably beyond the original estimates, and construction would fall significantly behind schedule. Consequently the scope of the subsector program would be reduced. Road and rail construction were particularly prone to this pattern.

By the end of the Fourth Plan in March 1973 Iran possessed a true national transportation network more or less adequate for its current needs. All weather trunk highways, either asphalt or gravel construction, extended into all regions of the country and interlinked all of Iran's larger cities. The feeder road program which commenced only in the latter portion of the Second Plan was beginning to bring the benefits of modern transport into the country's many small villages. Extensive reconstruction of the main highways had widened them and eliminated the steep slopes and sharp curves of the earlier alignments. The total length of asphalted roads had increased from some 500 kilometers in 1957 to 12,500 kilometers in 1973 with the total road system being approximately 50,000 kilometers.

The railroad had been considerably expanded beyond the original Trans-Iranian route with the various extensions eliminating some of the shortcomings of the Bandar Shahpur to Bandar Shah line. Although

accomplished by British wartime occupation forces, Khorramshahr had been linked to the railroad thereby enabling direct rail service between the country's largest and best equipped port and the capital, the most lucrative market in the country. Completion of the east-west route from Mashhad to Tabriz via Tehran extended service to two of Iran's major urban centers and into the productive Azarbaijan region. Additional important cities were joined by the further construction of the southeast line from Qum through Yazd toward Kerman and by the branch line to Isfahan. Thus rail service was made available over a much larger portion of the country. The line to Ghotur gave access to the European rail system, and improvement of the Julfa-Tabriz line afforded better rail connections with the Soviet Union. The total length of railways within Iran had increased from 2,561 kilometers in 1949 to 4,519 kilometers in 1973.

Starting from the most rudimentary conditions a network of airfields was constructed throughout the country to support air transportation. Many of the major cities were provided with first-class domestic airfields as well as the international airports at Mehrabad and four other cities.

The physical capacity of Iran's several ports had been vastly upgraded from the seriously degraded condition Overseas Consultants Inc. noted in 1949. Total port capacity was increased from considerably under one million tons annually in 1949 to 4.9 million tons at the end of the Fourth Plan. This increase was accomplished primarily by expansions to the Persian Gulf ports, especially the new one million ton capacity port at Bandar Abbas.

Yet these impressive physical expansions were not matched by needed improvements in management and operating procedures and a lack of adequate maintenance resulted in a too rapid deterioration of newly built facilities. Numerous reviews and surveys continuously commented upon the fragmented responsibility and poor operation and administration of the ports leading to only about a 50 percent utilization of available capacity. The Department of Civil Aviation was charged with inadequate maintenance and improper operation of the airports. The Iranian State Railways was considered a drain on the government's revenues due to its overstaffing and inflexible rate structure with its special rates to various government agencies. The Ministry of Roads was much less successful in maintaining the new and reconstructed roads than was it and the Plan Organization in overseeing their construction. Thus by 1971 deterioration of the overall road network rather than continued expansion was anticipated unless maintenance expenditure was considerably increased. By the end of the Fourth Plan resolution of these various deficiencies was becoming critical to the further orderly growth of Iran's transport system.

In 1973 the extent and condition of transportation facilities in Iran bore virtually no resemblance to the situation of the 1870's when there were not even the beginnings of a transportation system. There were neither railroads nor any roads at all suitable for wheeled traffic. Transport was by pack animals over primitive caravan routes often inferior in quality to those of earlier times. By 1921 the construction activities of British and Russian concessionaires and of these governments

had created the basis of a road network in the northwestern region and to the south of Tehran; however lack of maintenance had resulted in a serious deterioration of some of the new roads. The few railroad lines in no way provided even the basis for a national rail system. Facilities at Iran's ports were minimal.

When the government assumed an active role in upgrading the transport system under Reza Shah, it was very nearly starting from scratch. During the next several decades the government was struggling to catch up to the needs of the country for improved and expanded transport. The government was confronted with constantly increasing demands for improved highways both as to the quantity of vehicles and their size. Further the standards of acceptable construction became more demanding to accommodate the larger vehicles thus requiring extensive reconstruction of existing roads. With increasing foreign trade the ports had to be improved and enlarged. Construction of a railway system was deemed a desirable national objective. Although very beneficial in a country as large as Iran, the construction of air transport facilities placed another burden upon limited resources. The extensive construction activities during Reza Shah's rule created a network of metalled roads and the start of a railroad system. Allied activities during World War II markedly improved facilities in one restricted zone through the country. However, these improvements were short lived due to heavy war time usage and subsequent lack of maintenance. Elsewhere in the country the war was a time of deterioration due to neglected maintenance. Thus when the national development plans commenced in 1949, immense requirements for repair and new construction confronted the governments. Large scale efforts did not

commence until the Second Seven Year Plan in 1955 due to the economic difficulties of the oil nationalization period. Since then remarkable progress has been made. Although in 1973 much remained to be accomplished to extend modern transport into all of Iran's thousands of villages and to accommodate then anticipated economic growth, Iran had built a true national transportation network which was more or less adequate for its immediate foreseeable needs.

Notes to Chapter 5

¹International Engineering Company Inc., Report on Program for the Development of Iran, for Morrison-Knudsen International Co., Inc. (San Francisco, 1947), p. 32.

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³Ibid., p. 8.

⁴Ibid., p. 12.

⁵International Engineering Company, p. 33.

⁶Norman S. Roberts, Iran--Economic and Commercial Conditions (London: Department of Overseas Trade, 1948), p. 24.

⁷Overseas Consultants Inc., p. 13.

⁸International Engineering Company, p. 33.

⁹Overseas Consultants Inc., p. 12.

¹⁰Ibid., pp. 24-25.

¹¹Plan Organization, Division of Economic Affairs, Review of the Second Seven Year Plan Program of Iran (Tehran, 1960), p. 50.

¹²Julian Bharier, Economic Development in Iran 1900-1970 (London: Oxford University Press, 1971), p. 198.

¹³Roberts, p. 23.

¹⁴Ibid.

¹⁵Ibid.

¹⁶Overseas Consultants Inc., p. 6.

- ¹⁷Bharier, p. 198.
- ¹⁸Plan Organization, Review of the Second Seven Year Plan Program, p. 41.
- ¹⁹Overseas Consultants Inc., p. 26.
- ²⁰Ernst Zipkes, Road Construction and Maintenance in Iran (New York: United Nations, 1966), p. 31.
- ²¹Bharier, p. 198.
- ²²Ibid.
- ²³Zipkes, p. 18.
- ²⁴International Engineering Company, p. 33.
- ²⁵Overseas Consultants Inc., p. 39.
- ²⁶Ibid., pp. 39-40.
- ²⁷Bharier, p. 90.
- ²⁸Ibid., pp. 93-94.
- ²⁹Plan Organization, Review of the Second Seven Year Plan Program, p. 34.
- ³⁰Ibid., p. 35.
- ³¹Ibid.
- ³²Bharier, p. 210.
- ³³Ibid., p. 211.
- ³⁴Plan Organization, Review of the Second Seven Year Plan Program, p. 51.
- ³⁵Ibid., p. 50 and Bharier, pp. 208 and 211.

³⁶Plan Organization, Review of the Second Seven Year Plan Program, p. 42.

³⁷Van der Tak, Herman G. and Jan de Weille, Reappraisal of a Road Project in Iran. World Bank Occasional Staff Papers, no. 7 (Baltimore: John Hopkins Press, 1969), p. 8.

³⁸Zipkes, pp. 18-19.

³⁹Bharier, p. 200.

⁴⁰Van der Tak, p. 8.

⁴¹Plan Organization, Fourth National Development Plan 1968-1972 (Tehran, 1968), p. 190.

⁴²Plan Organization, Review of the Second Seven Year Plan Program, p. 42.

⁴³Ibid., pp. 42-43.

⁴⁴Bharier, p. 212.

⁴⁵Plan Organization, Fourth National Development Plan, p. 192.

⁴⁶Plan Organization, Review of the Second Seven Year Plan Program, p. 46.

⁴⁷Ibid., p. 48.

⁴⁸Bharier, p. 212.

⁴⁹Plan Organization, Division of Economic Affairs, Outline of the Third Plan, 1962-1968 (Tehran, 1961), p. 172.

⁵⁰Bharier, p. 212.

⁵¹Ibid., p. 211.

⁵²Plan Organization, Outline of the Third Plan, p. 175.

⁵³Plan Organization, Fourth National Development Plan, pp. 189-90.

- ⁵⁴Ibid., pp. 187 and 190.
- ⁵⁵Bharier, p. 201.
- ⁵⁶Plan Organization, Fourth National Development Plan, p. 196.
- ⁵⁷Rouhollah K. Ramazani, The Persian Gulf: Iran's Role (Charlottesville, Va.: University Press of Virginia, 1972), p. 82.
- ⁵⁸Ibid.
- ⁵⁹International Bank for Reconstruction and Development, Current Economic Position and Prospects of Iran, volume VI: Government Investment in the Fourth Plan (1968-1972) (1971), p. 27.
- ⁶⁰Ramazani, p. 82.
- ⁶¹Plan Organization, Fourth National Development Plan, p. 192.
- ⁶²Ibid.
- ⁶³Ibid., p. 195.
- ⁶⁴Bharier, p. 214.
- ⁶⁵Plan Organization, Fourth National Development Plan, pp. 206-7.
- ⁶⁶Ibid., p. 207 and Bharier, p. 212.
- ⁶⁷Plan Organization, Fourth National Development Plan, p. 195.
- ⁶⁸IBRD, p. 4.
- ⁶⁹Charles Issawi, "The Iranian Economy 1925-1975: Fifty Years of Economic Progress," in Iran Under the Pahlavis, ed. George Lenczowski (Stanford: Hoover Institution Press, 1978), p. 156.
- ⁷⁰Plan Organization, Fourth National Development Plan, p. 212-13.
- ⁷¹IBRD, p. 25.

⁷²Donald N. Wilber, Iran: Past and Present, 8th edition (Princeton: Princeton University Press, 1976), p. 329.

⁷³IBRD, p. 23.

⁷⁴Plan Organization, Summary of the Fifth National Development Plan 1973-1978 (Tehran), chapter 14, p. 7.

⁷⁵IBRD, pp. 23-24.

⁷⁶Issawi, p. 158.

⁷⁷IBRD, p. 24.

⁷⁸Ibid., p. 27.

⁷⁹Keith S. McLachlan, "The Iranian Economy, 1960-1976," in Twentieth Century Iran, ed. Hossein Amirsadeghi (New York: Holmes & Meier, 1977), p. 155.

Table 1
First Seven Year National Development Plan
Allocations and Expenditures
(billion rials)

Sector	Original Plan		1952 Revision		Actual Expenditure and Unpaid Obligations
	Amt	%	Amt	%	
Agriculture	5.3	25.0	7.3	27.8	5.7
Industry and Mines	4.0	19.1	5.3	20.2	3.1
Industry and Mines	3.0	14.3	4.3		2.9
Establish an Iranian Oil Company	1.0	4.8	1.0		0.2
Communications & Telecomm	5.7	27.4	7.7	29.3	3.5
Roads, Railways & Airports	5.0	23.8	7.0	26.6	3.5
Post, Telephones, & Telegraph	0.7	3.6	0.7	2.7	0.0
Social Affairs	6.0	28.5	6.0	22.8	0.8
Total	21.0		26.3		13.1

Source: Plan Organization, Review of the Second Year Plan Program of Iran, 10 March 1960, pp. 4-5.

Table 2

Second Seven Year National Development Plan
Allocations and Expenditures
(billions of rials)

<u>Sector</u>	<u>Original Plan</u>		<u>Revised Plan</u>		<u>Actual Expenditure</u>
	<u>Amt</u>	<u>%</u>	<u>Amt</u>	<u>%</u>	
Agriculture and Irrigation	18.2	26.0	18.9	21.7	17.4
Communications and Telecomm	22.8	32.6	30.4	34.8	27.3
Industries and Mines	10.6	15.1	6.7	7.7	7.0
Social Affairs	18.4	26.3	23.9	27.4	17.9
Social Affairs	---	---	11.7	13.4	9.3
Regional Development	---	---	12.2	14.0	8.6
Others	---	---	1.2	1.4	0.4
Total Development	70.0	100.0	81.1	93.0	70.0
Non-program Disbursement	---	---	6.1	7.0	13.2
Grand Total	70.0		87.2	100.0	83.2

Source: Plan Organization, Review of the Second Seven Year Plan Program of Iran, 10 March 1960, p. 6 for the Original Plan and Keith S. McLachlan, "The Iranian Economy, 1960-1976," in Hossein Amirsadeghi, editor, Twentieth Century Iran, p. 131 for the Revised Plan and Actual Expenditure.

Table 3

Allocations within the Communications and Telecommunications Sector
of the Second Seven Year National Development Plan
(billions of rials)

<u>Sub-sector</u>	<u>Original Plan</u>		<u>Revised Plan</u>	
	<u>Amt</u>	<u>Percentage of Plan Sector</u>	<u>Amt</u>	<u>Percentage of Plan Sector</u>
Roads	10.599	15.1 46.4	18.472	21.2 60.7
Railroads	6.244	8.9 27.4	5.357	6.1 17.6
Ports	2.487	3.6 10.9	2.858	3.3 9.4
Airports	1.387	2.0 6.1	2.094	2.4 6.9
Telecommunications	1.596	2.3 7.0	1.126	1.3 3.7
Cartography	.508	0.7 2.2	.501	0.6 1.6
Total	22.821	32.6 100.0	30.408	34.9 100.0

Source: Plan Organization, Division of Economic Affairs, Review of the Second Seven Year Plan Program of Iran, 10 March 1960, p. 34 for the Original Plan and Plan Organization, Budget Bureau, Revised Second Seven Year Development Plan, December 1959, p. 22 for the Revised Plan.

Table 4

Third National Development Plan Allocations and Expenditures
(billion rials)

Sector	Original Plan		1964 Revision		1965 Revision		Actual Expenditure
	Amt	%	Amt	%	Amt	%	
Agriculture and Irrigation	30.3	21.6	45.0	22.5	49.0	21.3	47.3
Industry and Mines	42.7	30.5	48.9	24.5	65.1	28.3	49.1
Electricity and Fuel	16.6		21.9		28.6		17.1
	26.1		27.0		36.5		32.0
Communication & Telecomm	30.0	21.4	50.0	25.0	59.5	25.9	53.8
Social Affairs	37.0	26.4	56.1	28.1	56.4	24.5	54.4
Education	13.5		17.9		18.1		17.5
Health	10.0		13.9		13.5		13.2
Labor and Manpower	6.2		8.0		3.2		2.8
Urban Develop	4.5		8.0		7.5		7.2
Other	2.8		8.3		14.1		13.7
Total	140.0		200.0		230.0		204.6

The Social Affairs category "Other" included Housing and Construction which in the 1965 Revision was allocated 12.4 billion rials.

Source: Bharier, Economic Development in Iran, p. 97 for the Original Plan and 1964 Revision and Central Bank of Iran, Annual Report and Balance Sheet, 1968, pp. 228-29 for the 1965 Revision and Actual Expenditure.

Table 5

Third Plan Allocations and Actual Disbursements in the
Communications and Telecommunications Sector
(billions of rials)

	Allocations		Disbursements	
	Amount	Percent	Amount	Percent
Roads				
Major Roads	38.15	64.2	36.093	67.1
Feeder Roads	28.90	48.6	27.024	50.2
	9.25	15.6	9.069	16.9
Railroads	7.20	12.1	5.996	11.1
Ports	4.60	7.7	4.017	7.5
Airports	3.00	5.0	2.781	5.2
Telecommunications	5.60	9.4	4.104	7.6
Meteorology	0.30	0.5	0.230	0.4
Cartography	0.20	0.3	0.196	0.4
Tourism	0.45	0.8	0.386	0.7
Total	59.50		53.803	

. Source: Central Bank of Iran, Annual Report and Balance Sheet, 1968, p. 191.

Table 6
Fourth National Development Plan Allocations and Expenditures
(billion rials)

Sector	Original Plan		First Revision		Second Revision		Actual Expenditure
	Amt	%	Amt	%	Amt	%	
Agriculture & Irrigation	113.5	23.6	89.1	17.1	92.0	16.6	83.2
Industry & Mines	163.3	34.0	212.2	40.7	219.5	39.6	208.1
Industry & Mines	99.0		112.5		115.6		113.1
Electric Power	38.0		35.1		42.2		37.7
Gas and Oil	26.3		64.6		61.7		57.3
Communications & Telecomm	100.3	20.9	117.5	22.5	130.8	23.6	110.1
Transport & Communications	80.0	16.7	80.3	15.4	84.3	15.2	71.4
Telecomm, Radio & TV	20.3	4.2	37.2	7.1	46.5	8.4	38.7
Social Affairs	102.9	21.4	103.0	19.8	112.2	20.2	105.4
Education	35.0		36.0		19.0		17.7
Health & Medical Services	13.75		16.0		15.7		14.2
Rural & Municipal Develop	16.1		12.6		19.4		18.1
Other	38.05		38.4		58.1		55.4
Total	480.00		521.7		554.5		506.8

The Social Affairs category "Other" consisted of statistics, research and regional development, social welfare, tourism, arts and culture, and construction and housing which received well over 50% of the allocations in this grouping.

Source: Plan Organization, Fourth National Development Plan, p. 63 for the Original Plan; IBRD, Current Economic Position and Prospects of Iran, Vol. VI, Table 11.0 for the First Revision; and McLachlan, "The Iranian Economy, 1960-1976," in Amirsadeghi, ed., Twentieth Century Iran, p. 149 for the Second Revision and Actual Expenditure.

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