ULTRA

Positions and Polarities Beyond Crisis

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The Advent of Modern Construction Techniques in Iran: Trans-Iranian Railway Stations (1933-1938)

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Keywords

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Abstract

It was only in the early 20th century that the concept of 'architect', as defined in Europe, was introduced in Iran. During the nineteenth century, Iranian architects were traditional master builders (*me'mars*) who would learn architecture after years of working with a master. This unique change in the conception of architecture in Iran took place during the interwar period. In 1926, when Reza Shah founded the Pahlavi dynasty, his policies toward rapid modernisation transformed the way architectural design and practice was performed in Iran. Among Reza Shah's earliest programs was the construction of numerous railway stations, extended from north to south, and for that, he invited Western-educated architects and European companies to Iran.
The architecture of railway stations became one among the earliest examples of Iranian modern architecture, leading to the introduction of modern materials such as reinforced concrete to Iran. By considering Reza Shah's nationalist policies and progressive agenda, this article investigates the architecture of railway stations, illuminating how their construction paved the way for the arrival of modern architecture and the development of construction technology in 1930s Iran.

Introduction

One of the major effects of technological progress was a change in the mechanisms of transportation in Iran[1] When Reza Shah seized power, he realised that the lack of a proper transportation system was a major obstacle to Iran's economic prosperity. Much of the country was sparsely settled; the major cities were hundreds of kilometres apart, with some roads running through inhospitable deserts. The population centres were separated from the oceans by high mountains. There were no rivers suitable for transportation over any distance, and transport was overwhelmingly by land through difficult terrain.[2] Also, all roads connecting major Iranian cities were unpaved, and the main means of transportation was by animals or carriages drawn by animals. Passing along these roads would be impossible during rain with these primitive means of transportation. Starting from the seventeenth century, Iran's geographical and environmental position on the one hand and the long distance between cities and markets on the other, necessitated a shelter for caravans and passengers and a network of caravanserais was constructed. In the Qajar era (1785-1925), traditional means of transportation continued to dominate Iran, and caravanserais were still serving as stations for passengers. In this period, with the expansion of sciences and technology from Europe, a new transportation system was introduced to Iran. Driven by the political ties between England, and Russia, as well as the economic benefits of the railway, Iran served as a bridge connecting the East to the West. The colonial powers began to entertain the idea of railway construction and gaining a concession from the Iranian state. However, in that period, a couple of factors hindered the construction of the railway. First of all, Russia and England were always competing against each other, thwarting any attempt to construct a railway by the other power in Iran. The second major barrier was the natural features of the Iranian landscapes, for no matter where the railway construction was initiated, it would face obstacles such as impenetrable mountains, large rivers, large valleys and deserts. Therefore, advanced technical and industrial expertise and vast financial resources were thus required to overcome those obstacles.[3] It was only through the foundation of the Pahlavi dynasty – simultaneous with the establishment of the postal system and telegraphy – that the establishment of roads and railways of an acceptable quality and roadbed was initiated in Iran.[4]

1. Bahram Rastin. Tarikh-E Haml_O Naghl,"History of transportation". *Journal of Economics*. 18 (January /February1987): 7.

2. Patrick Clawson, "Knitting Iran together: the land transport revolution, 1920-1940", *Iranian studies* 26, no. 3/4 (1993): 235.

3. "Trans Iranian railway,1927-38". *Journal of the Ministry of Transportation*, (1939): 17- 26.

4. Rastin. "History of transportation", 8.

Along with the rise of Reza Shah in 1926, there emerged a strong desire to modernise and industrialise the country. Inspired by the reforms of Mustafa Kemal Atatürk in Turkeys, Reza Shah declared that modernisation along Western lines was the only strategy to develop the country. To him, the success of Iran was largely dependent on the adoption of modern technologies and the eradication of the prevailing traditional (Islamic) culture.[5] The Shah displayed a propensity for the products of the machine age, such as railway transport, mining equipment, electric lighting and power stations all of which had been inaccessible in Iran prior to his ascent to the throne. He was committed to bringing as many of these modern technologies to his country, and for that purpose, he placed the construction of the Trans-Iranian Railway project among the main programs of reform.[6]

5. As violet conolly stated, all modern industries in Iran could be traced to the rise of the present Shah in 1926, and the direct outcomes of his initiatives.V.conolly. "The Industrialization of Persia", *Journal of the Royal Central Asian Society* 23. 3 (1935): 454-463.

6. V.Conolly, "The Industrialization of Persia", 455-456.

One among the chief measures adopted by Reza Shah to modernise Iran and connect its cities was to finalization of the unfinished railway project, known as 'the pet project of the Shah.'[7] For whom it was of great national and political significance. While its existence was a symbol of the new Iran (Iran-e novin), lack of an operating train network was deemed to be an underlying reason for the country's backwardness.[8] In addition, it was of great economic advantage to the person of the Shah. While connecting the eastern and western borders of Iran was of higher economic benefit, Reza Shah decided to locate both termini on Iranian soil, thereby connecting the Caspian Sea to the Persian Gulf by a north-south line. The direction of this line had some personal benefit for the Shah. He could suppress possible revolts by moving his military forces quickly from south to north, but it was also through the railway that Reza Shah could transfer the products of his northern lands to the south for export which made the Shah richer and the villagers poorer.[9]

The construction of the Trans-Iranian railway started in 1927 but intensified in the early 1930s when the state recruited a Danish company in 1933 to complete the construction in around five years. The project was constructed at the cost of $125,000,000, and was primarily financed domestically through the imposition of high taxes on sugar and tea.[10] The Ministry of Transport proposed several destinations. Eventually, a north-south line connecting Bandar Shah (Bandar Torkman) to Bandar Shahpour (Bandar Emam Khomeyni) was considered the most appropriate – a decision in line with the Shah's objective to reduce foreign interventions within the country (figure 1).[11]

7. M. Reza Ghods, "Government and Society in Iran, 1926--34," *Middle Eastern Studies* 27, no. 2 (April 1991): 219- 230.

8. Amir Bani Mas'ud, *Iran Contemporary Architecture* (Tehran: Honar-e Memari-e Qarn Publications, 2015) 185

9. See Ghods, Government and Society in Iran, and Szczepan Lemańczyk, "The Trans-Iranian Railway – History, Context and Consequences," *Middle Eastern Studies* 49, no. 2 (2013): 237-245.

10. T. Cuyler Young,"The Problem of Westernization in modern Iran", *The Middle East Journal* 2, no.1, (january1948): 53

11. "Trans Iranian railway", 39-41 & 59-65.

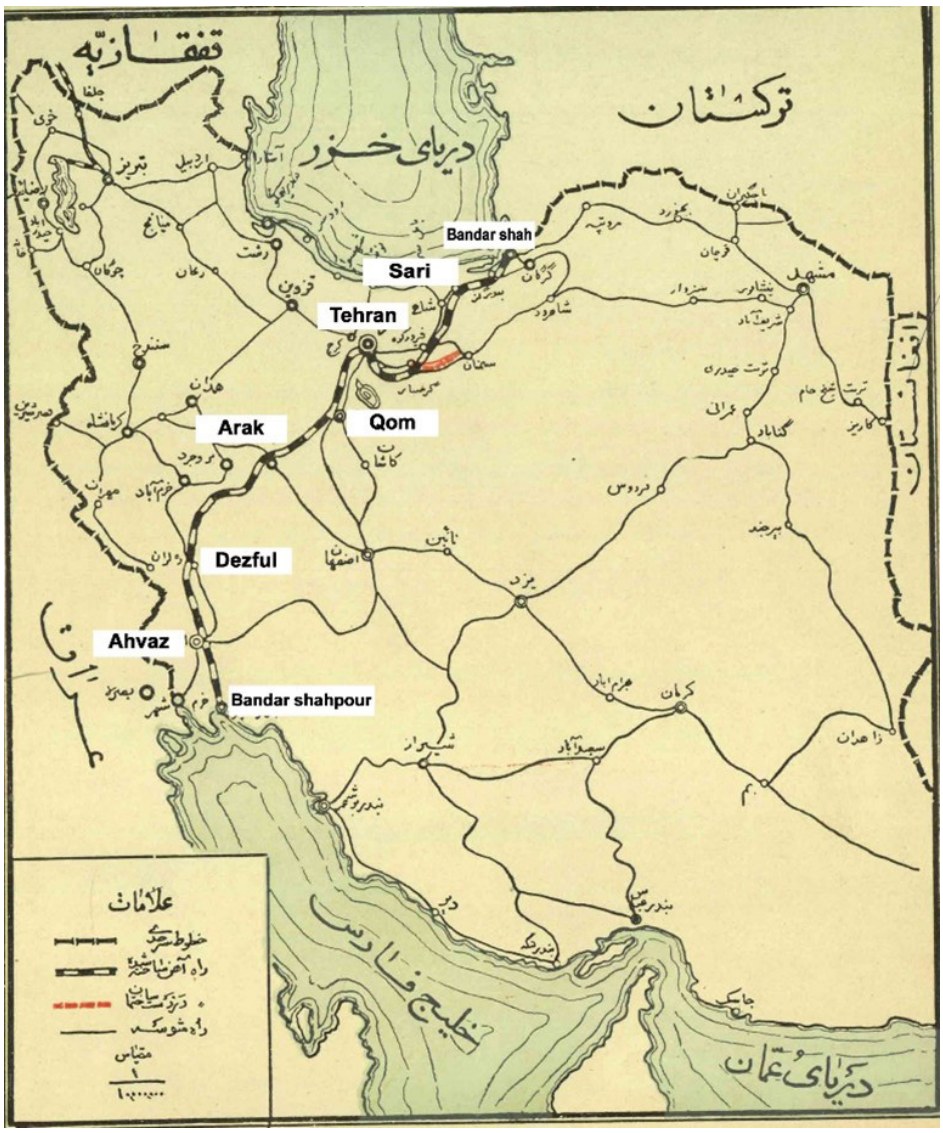

Figure 1: the Trans-Iranian Railway rout extending from north to south. Rah ahan sarasari Iran 1306-1317 (Trans-Iranian Railway 1927-38) (Tehran: Ministry of Transportation, 1938), 10. The image was modified by Golshan Moghassemi.

Construction of the Trans-Iranian railway exerted a considerable influence on the country's building industry, introducing the use of modern technology and materials, and in the process, substituting the Iranian vernacular architects (*Memar*) with Western-educated architects. The railway company, moreover, imported Western architectural styles, and contributed to the emergence of modern architecture of an Iranian expression within the country. In the following sections, features of railway station architecture will be explored, and the importance of the Trans-Iranian Railway project in the evolution of architectural design and construction in Iran will be clarified.

From Iranian Vernacular Architect (*me'mar*) to Western Educated Architect

In the vernacular architecture of Iran, the term "architect" (*me'mar*) referred to whoever learned design and construction under the apprenticeship of an ostad (master) without receiving any formal

education.[12] In the Pahlavi era, however, following the government's modernisation agenda, Iranian students were sent to Europe to study architecture. At the same time, foreign architects and companies began travelling to Iran to assist in constructing its modern appearance.[13] The earliest foreign companies travelling to Iran were the ones involved in the construction of the Trans-Iranian Railway. Among those companies that directed the construction of the Trans-Iranian Railway project was the Danish company of Kampsax. This consortium, which had already successfully established a railway in Turkey, proposed a plan to construct the Trans-Iranian Railway. The proposal was endorsed, and Kampsax established its office in Iran in 1933.[14]

Kampsax supervised the quality of projects based on some guidelines ordained by the Iranian government. The main provision involved the transfer of responsibility by the Iranian government to Kampsax about the complication of all technical and design for the railway workforce. Kampsax also managed the consortium's call for tenders for different parts of the railway construction and the general supervision. Additionally, the company was the advisor of the Iranian government on the purchase and sale of materials required for the railroad – ranging from locomotives to dynamite. Finally, Kampsax undertook to complete the northern and the southern railways in four and six years, respectively.

The Kampsax commenced its projects in the north and south of Iran by employing European engineers (Table 1).[15] Swedish engineers were mostly working in the north, while Americans worked in the south. The engineers in charge of the construction project were chiefly Danes, along with a handful of Swedes and Norwegians.[16] The contractors were mainly Italians (approximately a thousand Italian specialists, masons and workers came to Iran in the 1930s).[17] However, only a handful of Iranian engineers, all recently graduated from abroad, were qualified enough to join the Kampsax organisation, while their responsibilities were mostly limited to the supply of cheap labour. Still, Kampsax executive directors considered themselves as pioneers of technical and educational modernisation in Iran.[18] As Saxsild, a founding partner of Kampsax wrote in an official log of the company:

> "Kampsax left its mark on Iran not only directly by completing the Railway but also indirectly. The easier parts of the work on the Railway were carried out by native construction companies that were formed for the occasion and came, bit by bit, to learn the arts of the trade. It was of great importance for the country to establish a native engineering profession that could later take on whatever work might come along. It was no less important that the Iranian construction workers, who did not know the first thing about modern building methods before Kampsax arrived, went through schooling in their trade by the thousands under the supervision of foreign workers, so that Iran now has a qualified construction workforce that is familiar with and trained in modern construction methods. For its part, the government followed the Scandinavian approach very closely and this has left a permanent mark on all sectors of civil administration."[19]

Kampsax's activities eventually led to the foundation of national civil

12. Peyman Akhgar, "The École des Beaux-Arts and the Advent of Modern Architecture in Interwar Iran", *the 35th Annual Conference of the Society of Architectural Historians of Australia and New Zealand*, Victoria University of Wellington 4—7 July 2018: 3.

13. Due to the abundance of construction projects and lack of domestic expertise,a majority of civil projects were outsourced to European engineers especially Russian and a handful of projects were undertaken by Iranian architects, Bani Mas'ud, *Iran Contemporary Architecture*, 185.

14. Trans Iranian Railway, 40- 41.

15. Steen Andersen, "Building for the Shah: Market Entry, Political Reality and Risks on the Iranian Market, 1933–1939", *Enterprise and Society* 9: 4 (Cambridge University Press December 2008): 645, doi:10.1093/es/khn046

16. Andersen, "Building for the Shah", 645.

17. Conolly, "The Industrialization of Persia" 457.

18. Andersen, "Building for the Shah", 645.

19. The manuscript by Jørgen Saxild published in the Kampsax Company's 25 years' jubilee book. Kampsax Archive. Andersen, "Building for the Shah", 645.

companies in Iran. During this period, students who had been sent abroad by the government to study engineering came back home and launched their own architectural and construction offices. By drawing on experiences of designing and constructing the Trans-Iranian Railway project, they were able to undertake some massive projects for design of important government buildings in iran, such as banks, museums and ministries, and significantly contributed to changing the Iranian landscape. Influenced by the modernisation movement in Europe and Reza Shah's nationalist policies of forming a new Iran, by the late 1930s, the bulk of new buildings were constructed in accordance with the prevalent modern language while being considerate of creating a unique national style.[20]

20. Bani Mas'ud, *Iran Contemporary Architecture*, 193.

	Names of Contractors for the Northern Railway Line				
	Construction section From Bandar-e Torkman		Contracting company	Nationality	Manager(s)
	From kilometer	To kilometer			
North 6	192/500	202/200	Angiolini Balocha Company	Italy	A. Balocha
North 7	202/200	212/500	Angiolini Balocha Company	Italy	A. Balocha
North 8	212/500	220/080	G. R. Pizzagalli	Italy	Pizzagalli
North 9	220/080	231/300	Metora sacoprezia Company	Italy	Zervaso
North 10	231/300	237/800	Metora sacoprezia Company	Italy	Zervaso
North 11	237/800	249/000	Bruder Rodlich	Czechoslovakia	Gruiber
North 12	249/000	266/100	Neka Company	Iranian	Shahab Khosravani and Panahi
North 13	266/100	282/000	Kavosh Railway	Iranian	Abbas Aria and Reza Ghaffari
North 14	282/000	298/750	Beton	Iranian	Jafar Jafari and Leon Maleki
North 15	298/750	315/000	Hedayat Kalantari	Iranian	Eng. Hedayat Kalantari
North 16	315/000	332/000	A. V. D. Georgopoulos Company	Greece	Emia Georgopoulos
North 17	000/332	000/374	Chakot company	Greece	Nikolai Markof
North 18	374/000	416/000	Yanikian and Co. (Road building company)	Greece	A. Yanikian
North 19	416/000	454/000	Shaba company	Greece	Rahim Arjmand
Tehran station earthwork	From Tehran		Gholi Sepahi	Iranian	Ghoalmali Maykadeh
	North 5/500	South 5/000			
Tehran station buildings	-	-	Soufikt company	swiss	Meyer & kesselheim
North 20	5/000	51/400	Schuman contracting company for industrial works abroad	French	Shabur
North 21	51/400	98/500	Schuman contracting company for industrial works abroad	French	Shabur
North 22	98/500	145/000	Kojko company	Iranian	*Tormelon*
North 23	145/000	183/000	Etka Railway Company	Iranian	Eng. Hossein Shaqaqi
Names of Contractors for the Southern Railway Line					

Southern buildings	From Bandar-e Torkman		Sajsy company	Iranian	Eng. Fazlollah Jila
	127	191			
South 20	183/000	219/000	Iran and Greek Technical company	Iranian	George Gopoloss & Nosratian
South 19	219/000	255/000	Neka company	Iranian	Shahab Khosravani& Panahi
South 18	255/000	297/000	Contractor company section south 18	Iranian	Panahi
South 17	297/000	329/000	Bastan and Beton companies	Iranian	Javad Ghaffari & Reza Ghaffari
South 16	329/000	364/000	Beton company	Iranian	Jafar jafari& Asgarzadeh& Bina
South 15	From Bandar-e Emem Khomeini		Rey company	Iranian	Gholamali& meykade
	538/000	569/000			
South 14	502/700	538/000	Bastan and Beton companies	Iranian	Javad Ghaffari & Reza Ghaffari
South 13	461/200	502/700	Rah and Beton companies	Iranian	Afshar& Khameneh, jafari& Asgarzadeh& Bina
South 12	442/700	461/200	Saderat Bodaghian company	Iranian	Jebrail Bodaghian
South 11	425/600	442/200	Sookol Company	Belgian	Vander berget & vilar
South 10	409/000	425/600	Railway & Public Benefit	Belgian	Fornosari &diorter
South 9	392/700	409/000	Hochtif A.G.ESN	Belgian German	Bergan
South 8	376/500	392/700	Railway & Public Benefit	Belgian	Fornosari &diorter
South 7	362/000	376/500	Richard kosten (limited)	English	Estoward
South 6	347/180	362/000	N.M.K Company	English	Westerkard

South 5	334/400	347/180	Kasakofski & Roji Company	Iranian& french	koolen
South 4	323/900	334/400	Etka railway Company	Iranian	Hossein Shaqaqi, Ahmad mosadegh & Barbero
South 3	312/600	323/900	Angiolini Balocha Company	Italian	A. Balocha
South 2	300/000	312/600	Razan Company	Iranian	Yamin Esfandiari& Moghtader Shafia

Table 1. The list of Contractors worked on the construction of the Trans-Iranian Railway project in the reign of Reza Shah. Rah ahan sarasari Iran 1306-1317 (Trans-Iranian Railway 1927-38) (Tehran: Ministry of Transportation, 1938), 43-4.

The Arrival of New Materials and Techniques

21. Conolly, "the industrialization of Persia", 458.

The rapid expansion of new science and technology facilitated through the progressive agenda of change significantly contributed to the emergence of modern construction techniques in Iran, and the project of Trans-Iranian Railway played an essential role in that. A significant contribution of the Railway project to the advancement of modern technology in Iran was indeed the establishment of the first cement factory in the vicinity of Tehran in 1933 to primarily provide the necessary reinforced concrete for the construction of the Trans-Iranian Railway. The cement required for the Railway project was predominantly produced by the new factory, equipped with the most advanced machinery.[21] Due to its speed and solidity, reinforced concrete became very popular at that time, and massive projects such as bridges and tunnels were erected using that material (Figure 2). However, inter-city stations and buildings dedicated to accommodation were still built with traditional and local materials (Figure 3). As noted in the Journal of the Ministry of Roads:

22. Trans Iranian railway,89.

> "The buildings made of traditional materials were preferred over other types of buildings because they obviated the need for the utilisation and import of modern materials. Attempts were made to discover stone mines along the route before designing any scheme. Therefore, some samples were sent to a laboratory to be analysed for pressure, frigidity, and permeability. However, the results were often negative and it was inevitable to construct buildings with reinforced concrete instead of stone."[22]

23. Willem Floor, *Industrialization in Iran 1900-1941*, (England:University of Durham, 1984), 18-35.

24. Mina Marefat, *the Protagonists Who Shaped Modern Tehran' in Shahriar Adl, Bernard Orchard (eds.), Tehran the Capital of 200 Years*, (Tehran: Elmi va Farhangi Press, 1996), 103-133.

25. Laurence Lockhart, *Famous cities of Iran* (Brentford: Walter Preace & Co., 1939), 11

The foundation of the cement factory eventually led to the emergence of new building types and materials, such as steel, cement, and glass[23] as alternatives to traditional materials. Thanks to the railway project, by the late 1930s, reinforced concrete was massively produced for state-owned buildings, leaving a significant mark on the appearance and modernisation pace of the country.[24] The level of change was so rapid that Lockhart wrote in 1939, "It may truly be said that anyone returning to Tehran today after an absence of a few years would not recognise it."[25]

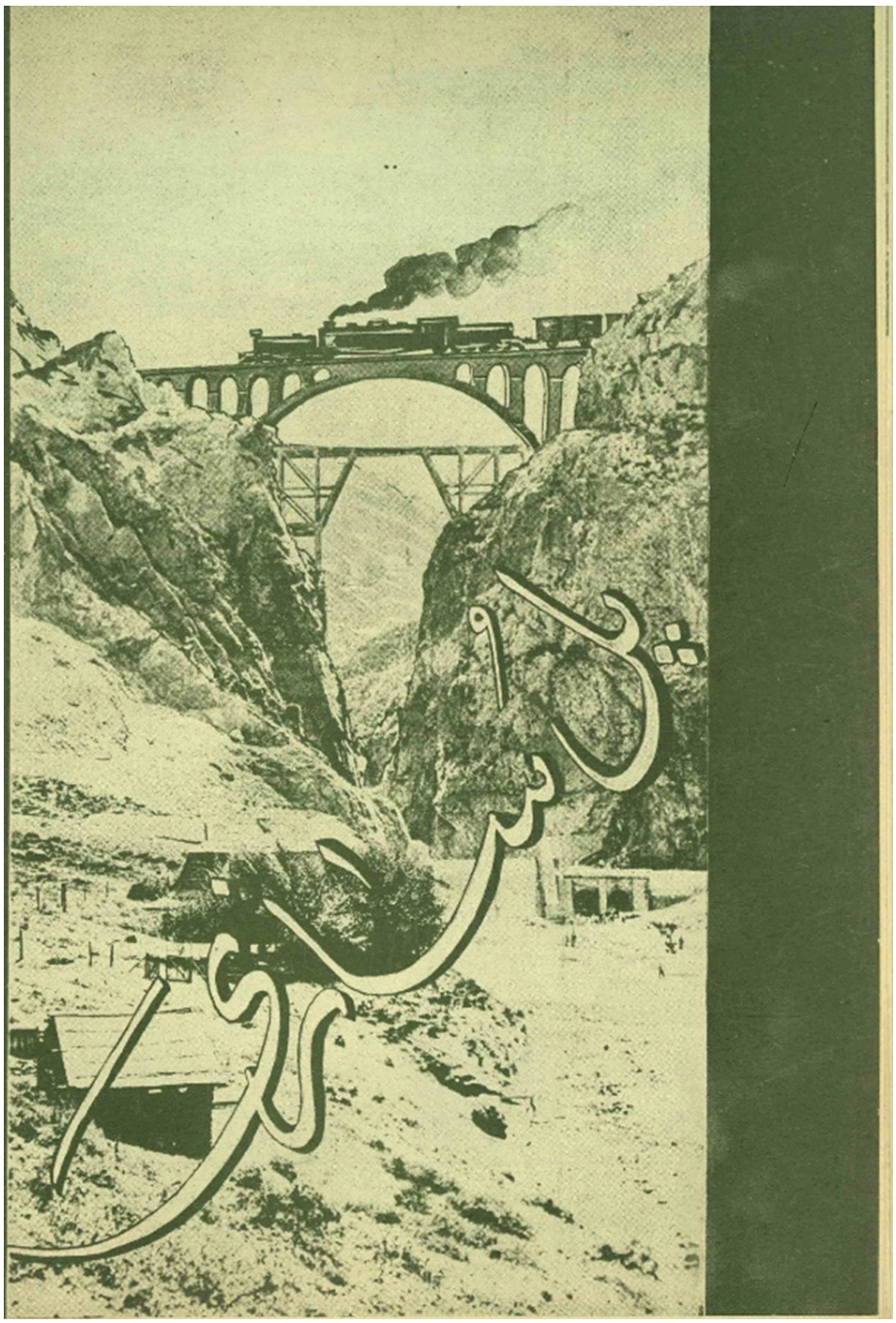

Figure 2: Veresk Bridge, located in the north of Iran constructed with reinforced concrete and stone. *Rah ahan sarasari Iran 1306-1317* (Trans-Iranian Railway 1927-38) (Tehran: Ministry of Transportation, 1938), 41.

Figure 3: Tehran station under construction with reinforced concrete structure in 1935. Courtesy of Philipp Holzmann AG Picture Archive, holzmann-bildarchiv.de/bauhistorische-forschung/bahnhof-teheran.

The Architecture of Railway Stations

In the process of Iranian modernity, the key role was played by Iranian intellectual elites, particularly by those who had spent some time abroad, bringing new ideas and distinct awareness of a modern way of life and material culture to Iran. For those educated elite, architecture an built environment became a main tool to express their modern identity. In the design of Trans-Iranian Railway stations, perhaps two distinct approaches are recognisable. These two approaches were reflective of the notion of Iranian nationalism characterised by making returns to the Iranian past and its ancient history, while imitating the West and absorbing its modern civilisation.

26. Trans Iranian Railway ,100.

Stations of the northern line, designed by foreign architects, were built in a simple, modern and so-called "Western" style,[26] characterised by their functionalism and use of concrete. They were usually constructed as two-story buildings with a program divided into two major parts on the ground floor, namely a salon and offices, while the second floor functioned as accommodation for the manager with a separate entrance allocated to it. In the design of these stations, the climate of the region was carefully considered. The buildings were usually of asymmetrical compositions and were covered in plaster. There were, however, no trace of Iranian elements on these buildings as they were exclusively following a functionalist approach in architectural design (figures 4, 5 and 6). These stations were the earliest instances of modern (non-traditional) architecture in Iran – an unprecedented architectural style to be later followed in the design of important government buildings, such as the Ministry of Finance and the University of Tehran, introducing Iran as a progressive country in favour of absorbing the latest technological advancement of the global society.

Figure 4: Bandargaz station, designed following the so-called Wester style, 1929-31. Courtesy of Philipp Holzmann AG Picture Archive, holzmann-bildarchiv.de/bauhistorische-forschung/holzmann-in-nahost.

Figure 5: Shirgah station in 1932-33. Denmark, Copenhagen, Courtesy of COWI A/S Archives.

Figure 6: Abbasabad station, constructed with a pitched roof as an adaptation to the climatic condition of the Iranian northern regions, 1932-33. Denmark, Copenhagen, Courtesy of COWI A/S Archives.

In contrast to the northern stations, most stations on the southern line, following the nationalist views propagated by Reza Shah and the educated elite to venerate the grandeur of the Iranian past, were built in a so-called "Iranian" style. In designing these buildings, Iranian motifs and materials borrowed from Islamic and pre-Islamic eras, such as mud bricks, round and pointed arches, and geometric carving patterns at major stations such as the ones in Ahvaz and Qom, were adopted.[27] However, apart from a few references to the Iranian past, these southern stations were still simple and purified surfaces deprived of any references to Iranian decorative patterns. The styles of these stations significantly influenced the formation of Iranian modern architecture of the time as they turned into the earliest instances of modern buildings which retained Iranian expression, representative of Iran as an emerging country with an old civilisation – a prologue to the design of several government buildings, such as Iranian National Banks and the Post Office building, erected with a similar approach of expressing explicit links to the Iranian past in the 1930s (figure 7, 8 and 9)

27. Trans Iranian Railway ,100-103.

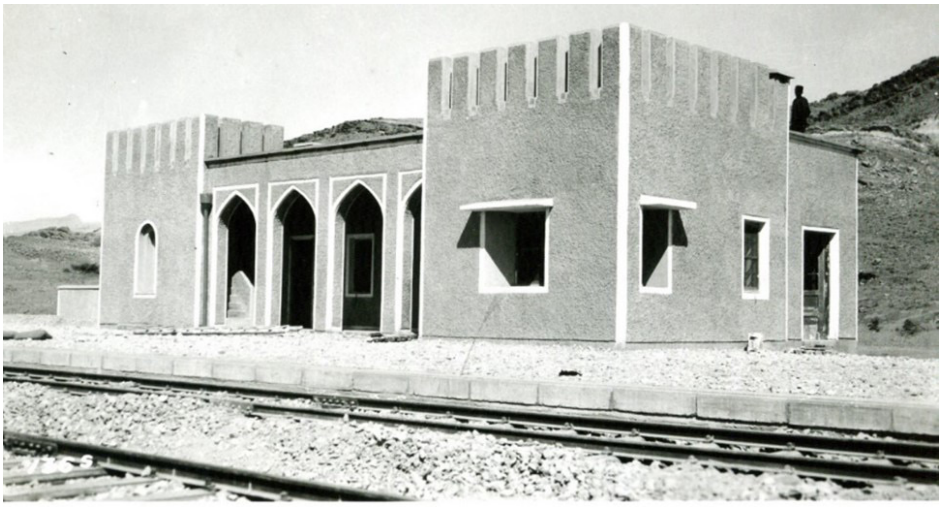

Figure 7: Galeh-Cheikh station, built with elements borrowed from Iranian architecture, 1936-37. Denmark, Copenhagen, Courtesy of COWI A/S Archives.

Figure 8: Qom station, designed with the Iranian pointed arches flanked by two symmetrical wings, 1935-36. Denmark, Copenhagen, Courtesy of COWI A/S Archives.

Figure 9: Garm-Amir Station, 1936-37. Denmark, Copenhagen, Courtesy of COWI A/S Archives.

Conclusion

The materialisation of the Trans-Iranian Railway was among Reza Shah's earliest programs of reform to which he dedicated the greatest budget. It was not only a project of national significance but was a means to connect the country, taking modernisation and its products to every corner of it. For that purpose, in an unprecedented manner, a great number of foreign construction companies were invited to Iran, and a cement factory was founded to facilitate the use of reinforced concrete for the construction of the Railway's massive structures. The construction of the Trans-Iranian Railway significantly changed the appearance of the country, but more importantly, it introduced an approach in architectural design and construction, considerably different from what was practised in Iranian traditional architecture. The availability of reinforced concrete changed the construction pace of the forthcoming buildings and provided a base for Iranian Western-educated architects to practice architecture in a manner similar to the way architectural design and construction were performed in the West.