

## Chapter 1

# The Historical Background

Why, despite roots dating back to the nineteenth century, did modern science become truly significant only after around 1910 in Iran? Why did the popularization of science, the instruction of a large number of pupils and students, and modernist professionals' practical application of scientific knowledge for state-led reforms only start at that point?

In the wake of the Constitutional Revolution (1905–11), an emerging modern middle class argued that the earlier reformist focus on politics had failed. True change, the new creed held, would come about only through profound sociocultural reforms—and modern science was the key that would unlock that door. This reformist change of mind was of consequence only, however, because it interacted with momentous social and political transformations and a shift in Iran's international position. The so-called Great Game preserving regional geostrategic stability did not survive World War I. Britain and Russia, the latter now communist, ceased trying to “spuriously conserve”<sup>1</sup> the court and the tribal order, to freeze Iran in an underdeveloped state, and thereby to hamper educational and scientific development. Around the same time, a modern middle class began to emerge in Iran, replacing the Qajar court as the spearhead of modern sociocultural production and the adoption of modern science, boosting their popularization, instruction, and practical application. Finally, the patrimonial Qajar bureaucracy gave way to a reformed, interventionist state administration interested in advancing higher modern education.

### THE DOMINANCE OF POLITICS: THE NINETEENTH CENTURY AND THE CONSTITUTIONAL REVOLUTION'S FOCUS ON ADMINISTRATIVE AND LEGAL REFORM

Until around 1910, political, administrative, legal, and financial reforms were seen as the true key to progress. Restructuring the state, rather

than science-based sociocultural reform, was the order of the day. This did not preclude advocacy of science as a means to reinforce government, the opening, in 1851, of the Dār ol-Fonun (Polytechnic School), or the publication of texts on medicine and public health.<sup>2</sup> But the number of such writings and their effects remained limited,<sup>3</sup> and they were dwarfed by the attention paid to these subjects from the 1920s on. They were neither set in the context of pressing postrevolutionary political fears and accelerating social transformation nor matched by coherent practical measures. In this sense, they reflected nineteenth-century political reform. Nāser al-Din Shāh's (r. 1848–96) personal fear of losing power, a resilient patrimonial sociopolitical configuration, an infrastructurally weak state that had to bargain with social groups to preserve stability, and external colonial interests all helped ensure that talk about change outpaced real reforms.<sup>4</sup>

The Qajars took the first hesitant steps to reform the state structure during the first half of the nineteenth century, when such endeavors, including medical reforms, were already reactions to European—at that time, specifically Russian—threats to and actual encroachment on Iranian territory. “As in the Ottoman Empire, the military field was one of the first in which change and adaptations to European models was attempted. . . . But the army could not be reformed in isolation and without introducing changes in the administrative and financial spheres.”<sup>5</sup>

The interest in administrative reform born in the first half of the nineteenth century came of age in the 1850s. The short-lived, ultimately futile, administrative reforms initiated in 1850–51 by the ill-fated Amir Kabir, resumed following defeat in the 1856–57 Anglo-Persian war and resuscitated for a few more years following a disastrous famine in 1870, reflected a “heightened sense of crisis.”<sup>6</sup> Iran's defeat in 1857 especially reinforced the impression that “the main reason for the superior power of Western European nations was their form of government. . . . for the first time thought began to be given, not merely to the reform of abuses, but to a reform of the actual system of government.”<sup>7</sup>

In 1858–59, the reformer Malkom Khān published *Ketābcheh-ye Ghaybi*, an essay calling for the rule of law, separation of powers, and ministerial reorganization, which signaled the start of a new reformist phase in Iran. Malkom's political and administrative demands were echoed by other thinkers, and remained at the center of reformist thought up to and slightly beyond the 1905–11 Constitutional Revolution.<sup>8</sup> However, contexts slowly changed toward the end of the nineteenth century. Until that point, reform of the patrimonial governmental structure, advocated by small parts of the governing elite and by a tiny circle of modernist intellectuals, was meant to promote progress and reinforce territorial defense. After that stage, it also addressed what more and more people perceived as unjust challenges to the political, economic, and fiscal status

quo.<sup>9</sup> With reform attempts hitting an all-time low and Nāser al-Din Shāh retreating into his harem, the late nineteenth century witnessed rising calls for “measures to correct abuses, to check the untrammelled authority of the Shah and his officials and to permit the people a voice in the decisions affecting their lives. These demands were expressed in a number of newspapers, books, and other publications that began to appear in the early 1890s.”<sup>10</sup>

At that point, one of the most influential reformers was Malkom Khān. Drawing on thinkers like Yusef Khān *Mostashar al-Dawleh*,<sup>11</sup> he further developed his own political ideas and, in 1890, he launched the newspaper *Qānun* (Law [–1898]). Printed in London and smuggled into Iran, it “called for laws guaranteeing the security of life, property and honor of the inhabitants.” Moreover, “whereas in the past, Malkom had viewed reform as requiring the extension of governmental control over the country . . . he now laid much greater emphasis on the need for checks on governmental authority.” He was the first to call for a parliament both larger and more powerful than the consultative councils he had advocated earlier on.<sup>12</sup> But he rejected the suggestion by his famous collaborator Mirzā Āqā Khān Kermāni, an Istanbul-based reformist, that “items of scientific interest and descriptions of recent inventions” be included in *Qānun*.<sup>13</sup> Other cases reinforce the impression that prior to 1900, it was not so much science-based social, but rather political, administrative, and legal change that formed the core of Iranian reformist thought.<sup>14</sup> In *Qānun-e Muzaffari* (The Law of Muzaffar), for instance, Malik al-Muvarrikhin insisted that reform of the legal system was key to reforming taxation. And in *Siyāhatnāmeḥ-ye Ebrāhīm Beq* (The Travelogue of Ebrāhīm Beq) and *Ketāb-e Ahmad* (The Book of Ahmad), the prominent intellectuals Marāghei and Tālebof called for the establishment of legislative institutions.<sup>15</sup>

It is thus unsurprising that legal, political, and administrative reforms characterized the Constitutional Revolution. In fact, they were the common denominator binding together the diverse participating groups.<sup>16</sup> Big merchants and parts of the clergy were interested in restoring an idealized political relationship between crown and subjects, known as the Circle of Justice.<sup>17</sup> The tiny reformist intelligentsia developed Western political philosophy and institutional ideas; since the 1890s, religious dissidents had collaborated in these efforts. Moreover, the intelligentsia, junior partners of the nascent traditional middle class since the 1891 Tobacco Revolt, tried to persuade clergymen and merchants to build the Circle of Justice on a new institution, giving rise to the idea of an *‘adālat-khāneh* (House of Justice), soon to become a (religiously sanctioned) parliament.<sup>18</sup> Indisputably, the intelligentsia and dissidents—encompassing the “three major revolutionary trends simultaneously at work in the Constitutional struggle: Shia radicalism, Western liberalism, and Russian

Social Democracy”<sup>19</sup>—did not only pursue political interests. They also sought to curtail the clergy’s sociocultural prerogatives.<sup>20</sup> However, conflict over these matters was muted during the 1906–7 passing of the Fundamental Law and the Supplementary Fundamental Law—the revolutionary coalition’s common political objective—and emerged in the second Majlis (1909–11). And even after 1909, debates about how to cure “sick mother Iran” still turned mainly on remedying *estebdād*—tyranny and oppression.<sup>21</sup>

In sum, just as nineteenth-century reformist thought had principally focused on legal, administrative, and political change, the 1905–6 Constitutional Revolution sought to address Iran’s deep-seated problems through reforms in these areas.<sup>22</sup> In this sense, it confirms Theda Skocpol’s thesis about the dominance of issues of state power and political control in revolutions.<sup>23</sup>

#### THE RISE OF SOCIOCULTURAL CONCERNS AFTER THE CONSTITUTIONAL REVOLUTION

A decade after the onset of the Constitutional Revolution, the political mood of many Iranians started to change. Political, legal, and administrative reforms had not delivered on their promises. Priorities needed to be reassessed. Many were convinced that the revolution had triggered social chaos and was not an iota better than the Qajar monarchy.<sup>24</sup> The weak political center’s failure to govern Iran and defend its territorial integrity during World War I underscored the fact that the Constitutional government alone could not enforce law and order. Within a decade of the revolution, Iranians began to associate the term *mashruteh* (constitutional) with anarchy and chaos, killing and looting.<sup>25</sup>

At a time of accelerating social diversification, Iranians reacted to this predicament in different ways. The emerging modern middle class called for far-reaching social and cultural changes. For a few years after 1905, a small modernist intelligentsia had tried to ride the wave of the revolution to carry out such reforms. Much ink was spilled,<sup>26</sup> and a few hesitant steps were taken. But the vested interests of powerful social groups and the lack of adequate resources and supporters proved insurmountable.<sup>27</sup> The platform of the Hezb-e Demokrāt (Democratic Party), founded during the second Majlis and led by the radical secular Taqizadeh and the socialist Qajar prince Soleyman Eskandari, stated that for the first time in its history, Iran was being shaken not simply by a political but also by a social crisis.<sup>28</sup> Disillusion deepened in the 1910s. The conviction that political revolution had gone awry gained currency among the emerging modern middle class.<sup>29</sup> It located those responsible in all social groups, but identified the political elite, the clergy, and “the masses” as the main culprits.<sup>30</sup>

Many believed that postrevolutionary politicians and administrators were no better than their corrupt royal predecessors. Also, they had their personal interests in mind. This charge was echoed by journals and aptly illustrated by one of the first modern Iranian short stories, Jamālzādeh's satire "The Political Figure."<sup>31</sup> Attacks on the clergy had started in the later nineteenth century, reached a high pitch during the revolution, and remained virulent for decades to come. The anti-clerical *Farangestān* [Europe]<sup>32</sup> called for "an iron fist [when] hitting the mouth of the illiterate clergy who think that the spread of education and culture causes irreligiosity."<sup>33</sup> Modernist critics complained that the clergymen's flawed knowledge was exacerbated by their organizational strength and the prestige they used to subvert the revolution when it had ceased to serve their interests.<sup>34</sup> The masses constituted the last main threat. Their ignorance emasculated political change and sociocultural reform, and made them easy prey for reactionary manipulators. The danger was epitomized by the masses alleged contribution to the collapse of the revolution:

In the same way in which the government of an enlightened majority always saves the nation, the eighteen years of Constitutionalism in Iran have confirmed that the dominance of an ignorant majority has become the source of Iranian backwardness. How is it possible to rely on majority [rule] and a parliamentary government in an environment in which barely one out of a hundred [persons] is literate? . . . The [Constitutional] revolution has been flawed. The majority of people have stepped ignorantly onto that field without knowing what they want.<sup>35</sup>

In this situation, the men and women who were starting to form a modern middle class believed themselves to be Iran's only possible saviors. Who else, they asked, could save the homeland from chaos and degeneration?

Demands for changes in areas other than politics were not new. Calls for sociocultural change—in education, religion, women's status, public health, and hygiene—were part of the prerevolutionary reformist lexicon. For the most part, they were made by a small intelligentsia; at times, as in the question of sanitary control, foreign powers played a role as well.<sup>36</sup> However, the cross-class coalition that launched the revolution practically intended and discursively understood it to be first and foremost a political event. Certainly, a tiny group of secular modernists sought to use the revolutionary momentum for social and cultural reforms. But it was only in the 1910s, owing to the state's failure to promote sociocultural reforms, that modernists started to rethink the relation between political and sociocultural reforms. Now the latter were the precondition for political maturity—and for progress in general.

What type of revolution can prevent Iran from rapid decline? For an answer to this question, one [has to] look at the history of revolution in different countries. Revolutions in almost any place in the world have progressed

in a distinct way. First, an educational and religious revolution paves the way for a political revolution, and then, in the cradle of politically free countries, social thought[s] are developed. Political revolution without an educational and religious revolution produces the same result that can be seen in present-day Iran.<sup>37</sup>

Terms referring primarily to politics, dominant during the revolutionary years, were marginalized or rethought a decade later. *Āzādi* (freedom), for instance, had signified “first, freedom from the domestic despotic tyrant, second, freedom from the external foreign threats of colonialism.”<sup>38</sup> After the revolution, modernists argued that real political freedom was attainable only if and when individuals have set themselves free.<sup>39</sup>

Literary and scientific journals published from the 1910s on struck similar notes and tried to disassociate themselves from political factionalism. Launching *Dāneshkadeh* (1918), the poet-editor *Malek al-Shoʻarā* Bahār stressed that “our journal vehemently shuns political quarrels and amusements that, by eulogizing or lampooning this or that person, have become *en vogue*.” Introducing a collection of essays submitted to *Shafaq-e sorkh* in response to the question “What is the ideal nation?” Dabir-e ʻAzam exclaimed: “I do not know of any newspaper that has [at any point during] the Constitutional Revolution adequately debated any scientific, philosophical, or industrial topics.” The journal *Kāveh* also made its preferences clear. Inaugurating the journal’s second year, Taqizādeh wrote that “a thousand times more important than political and governmental reforms are *national public education* for the young and old, men and women, abolishing opium, preventing illness, encouraging physical exercise, acquiring the protocols of civilization from Europe and hindering groundless anxieties, superstitions, ignorance, and fanaticism. The salvation of the nation depends on it.” Introducing the new educational journal *Majalleh-ye Osul-e Taʻlimāt*, the modernist author ʻAli Akbar Siyāsi insisted that Iran’s real problems were ignorance and corrupt morality. Political ideologies like socialism and capitalism offered useful principles but, unfortunately, did not pay attention to these fundamental issues.<sup>40</sup>

Other publications simply dedicated much more space to urgent social and cultural problems than to politics and related concepts like justice. In 1922, the Berlin-based journal *Irānshahr* announced in its opening number that it would endeavor “to create a pure and free milieu for the development of the young Iranian race’s intellectual forces” and to “clarify the secrets of the European nations’ progress and explain Iran’s real needs for European civilization.” “[We shall] try by all scientific means to uproot the corruption of morality from the ground of the new generation of young Iran.”<sup>41</sup> Rather than specifying the political system that would carry out these projects, it laid responsibility for change at the feet of the younger generation. The inaugural number of *Āyandeh*, published in Tehran in 1925, declared that “our social ideal and wish is the defense

and conclusion of Iran's national unity." The latter, understood as the "political, moral, and social unity of the people," was to be engineered by social, economical, and cultural reforms. However, the author asserted that reforms had to be carried out by a strong state based on an effective army and a healthy treasury. And he made it clear what kind of unity he had in mind: "It was the ideal of national unity that caused the creation of the great German Kaiser and nation, it was this wish that caused the establishment of the new Italian monarchy, . . . and finally, it was this great intellectual and moral force that inspired the defeated Turks with a new spirit."<sup>42</sup>

When modernists addressed politics in the late 1910s and early 1920s, they called for a strong leader. Certainly, other groups were also waiting for such a figure.<sup>43</sup> But modernists wanted him not simply to improve security. They needed him to help launch their sociocultural reformist plans:

A man of thought, of new thought, needs to assume governmental powers and put an end to this situation by acting in a new way. But from which group of people must somebody endowed with such thought and such activity rise? It will surely be no clergyman. . . . It can be no *bāzāri* or merchant. . . . In my opinion, such an individual has to rise from amongst the modern, educated persons, especially from among those who are thoroughly acquainted with Europe. He needs to possess two traits: efficiency and science. . . . Mussolini, the present prime minister of Italy is a dictator. Mussolini has both traits. . . . If you want to make a revolution, if you want to destroy the obstacles in the way of progress and education, if you want one day to savor the joy of freedom—the freedom embraced today by the Europeans—you must bring forth an enlightened dictator [*diktātur-e 'ālem*].<sup>44</sup>

Postrevolutionary disillusionment drove some modernists to adopt politically elitist, if not anti-democratic, positions.<sup>45</sup> However, by the late 1920s at the latest, it began to dawn also on the modern middle class what a heavy price—in terms of political freedom—it had to pay for the autocratic type of modernization prescribed by Rezā Shāh Pahlavi (r. 1921–41).<sup>46</sup>

In any case, the issue of political systems and concepts was moving into the background. Since the later 1920s, this process had been hastened by an autocrat who repressed political dissent. But its underlying structural cause was the formation of a modern middle class determined to turn its sociocultural reformist strategy into the very hub of a new agenda of progress and modernization.

#### THE POSTREVOLUTIONARY ADVANCE OF MODERN SCIENCE

This postrevolutionary conviction of the superiority of long-term sociocultural over swift political reforms went hand in hand with the belief that such reforms needed to be founded on a sound scientific base.

The press vividly reflected the reformist context of the rise of modern science. In the late nineteenth century and throughout the Constitutional Revolution, most newspapers focused on political reform. Scientific and medical journals were heavily outnumbered. The last pre-revolutionary decade had been represented by the London-based *Qānun*, the Calcutta-based *Habl al-Matin*, and the Cairo-based *Hekmat*, *Sorayyā*, and *Parvaresh*;<sup>47</sup> then, starting in 1905–6, a torrent of newly founded political newspapers document an insurrectionary state of mind. A handful of scientific and medical journals had been published since the later nineteenth century. There was the official *‘Elmiyeh* (1864–70), associated with Tehran’s Dār ol-Fonun and managed by Minister ‘Ali Qoli Mirzā *E’temād al-Saltaneh*; *Dānesh*, the short-lived organ of the Dār ol-Fonun, published in 1882; *Adab*, founded in 1898 to “promote knowledge and civilization”;<sup>48</sup> the first medical journal, *Hefz al-Sehheh* (1901), run, in Tehran, by *Mo’addeb al-Dawleh* Nafisi; and *Ganjineh-ye Fonun* (1903–4), edited in Tabriz by Mirzā Muhammad Khān Tarbiyat. Most of these were published only for short stretches of time. Only six issues of *Hefz al-Sehheh* appeared, for instance. Its farewell number lamented “Iranians’ lack of awareness of hygienic issues and their failure to welcome the journal.”<sup>49</sup>

During the revolution, the overwhelming majority of the now flourishing media reported and commented on current events and politics.<sup>50</sup> Only a few journals—*Rahnamā* (1907), *Bahār* (1910), *Sa’adat* (1911), *Āftāb* (1911), and the women’s journals *Shokufeh* (1913) and to some degree *Dānesh* (1910) and *Ahd-e Taraqqi* (1914)—focused on medical and/or scientific topics. The few journals that touched upon scientific topics were mostly established in the first half of the 1910s, that is, after the six decisive years of the revolution. They appear to have been a first step in the direction of the apolitical journals that dominated in the late 1910s, rather than an immediate reflection of revolutionary thought and action.

The dominance of politics during the revolution was manifest even in the pages of the few apolitical journals, where authors underscored that political reform was not the only key to progress. The author of the inaugural article in *Rahnamā* (1907), a “political, scientific, moral, and legal” journal, insisted that “today, the interest . . . of all Iranians lies in the defense of state politics. . . . [They] . . . completely disregard all other matters.” *Rahnamā* was to address this shortcoming by publishing on scientific topics. *Ahd-e Taraqqi* (1914) focused on technological innovations like airplanes, telephones, and railways, arguing that the press “[is] not only limited to political newspapers and news. Rather, scientific journals are also necessary.”<sup>51</sup>

The number of scientific journals increased slowly in the 1910s, and interest in science started to crystallize toward the end of that decade. Interest in modern science and sociocultural reforms were interrelated: the former was believed to drive the latter. Attention to science also waxed

because, since the later 1920s, the iron grip of Rezā Shāh's autocratic regime had choked off political critique. However, the fervor of apolitical reformist writings, and continuing interest in sociocultural and scientific matters after the shah's fall in 1941, show that between the wars, too, such interest was not an alternative to political critique. Rather, it was the continuation of the modernists' postrevolutionary focus on sociocultural reforms. This concern was palpable in prominent broad-spectrum journals like *Kāveh* (founded 1916–20), *Shefaq-e sorkh* (1921), *Irānshahr* (1922), *Farangestān* (1924), *Āyandeh* (1925), *Bākhtar* (1933), and *Mehr* (1933). And it leaped from the pages of more specialized publications endeavoring to popularize modern sciences.<sup>52</sup> Most publications, several dozen titles, were private.<sup>53</sup> A smaller number were the organs of governmental agencies, which had started to expand their staffs and activities since the early 1920s.<sup>54</sup> However, private and public journals did not differ in content; authors often published in both.

The Qajars' inability to create conditions appropriate for the systematic adoption of modern sciences was a result of the same factors that were also debilitating political reforms: Nāser al-Din Shāh's fear of losing power, the court's and society's patrimonial structure, and Iran's semi-colonial position. A. Reza Sheikholeslami notes:

Through the years of Naser ad-Din Shah's exercise of power, the partial success of reformers and familiarity with the West, a certain degree of institutionalization took place. . . . Yet the prevailing themes of the administration were traditional and its modes primordial. The most characteristic aspect of Naser ad-Din Shah's reign [was] the absence of any consistent policy. [The shah's] authority with other patriarchies, namely the tribes, the olama [religious leaders], and local notables, varied markedly from the authority he maintained with the officials of the central administration. Here the authorities were not necessarily absolutist or discretionary. In addition . . . Naser ad-Din Shah's reign coincided with the apogee of European imperialism. His exercise of authority, therefore, vacillated between his ambitions for absolute sovereignty and the realization of his impotence in the face of Europe. . . . Short of cash and hoping to extend his power through centralization, the shah at times supported the attempts of "reformists." Then, realizing the long-term threats to his sovereignty, he would reverse himself. . . . He [thus] was pulled by different forces.<sup>55</sup>

The stifling effects of royal rule, patrimonialism, and colonialism on the spread of modern sciences showed in a number of ways. Nāser-al Din Shāh feared that higher educational institutions' use of science would instruct too many people and might thus threaten his rule. He soon lost interest in the Dār ol-Fonun, which was transformed into a secondary school in 1891–92. In 1873, he prohibited the government from sending students to foreign countries. He sought to introduce, but soon abandoned, the idea of state certification of physicians, and, inasmuch as his

interest in Europe was atechanical, he was indifferent to Iran's industrialization.<sup>56</sup> Up to the revolution, the Qajar state desisted from investing in elementary schools. Primary and secondary education was almost entirely in the hands of the clergy, and, since the late nineteenth century, of missionaries and private Iranian modernists.<sup>57</sup> Moreover, public health measures were irregular, unsystematic, and inadequate. Pressures exerted by Western powers since the 1866 Istanbul Sanitary Conference and the 1868 founding of the *Majles-e Hefz al-Sehhat* (*Assemblée d'hygiène*) had no lasting affect. "Until the start of the twentieth century, the Persian government continued to evince very little enthusiasm in the domain of health, thereby alarming the powers."<sup>58</sup> As late as 1904, Iran was hit by a catastrophic cholera epidemic. Recurrent epidemics alarmed the tiny intelligentsia, who debated them in a number of texts on medicine and hygiene.<sup>59</sup> But Iran's sociopolitical structure—the limited power and lack of interest of the court, the weakness and tiny size of the intelligentsia—condemned public health reform measures to failure in the long run.

Finally, the Anglo-Russian Great Game hemmed in Iran's development—perhaps precisely because the country was never occupied. Until 1907, the two powers sought to keep each other in check, and "spuriously conserved"<sup>60</sup> the patrimonial court and tribal order. While maintaining an important measure of political power, Iran turned into a semi-colonial polity, its sovereignty undermined, and its educational and scientific development curbed.<sup>61</sup> The Austrians, and from the late 1850s on, the French, stepped in to fill the vacuum. The latter, especially, self-interestedly assisted in the teaching of modern sciences and medicine in the *Dār ol-Fonun*. However, for five decades, the *Dār* remained the only state institution of higher education, and quite a small one at that.<sup>62</sup> Compared with the Ottoman empire or Egypt, Iran produced a very limited number of graduates, and the few students educated abroad did not fill the gap.<sup>63</sup> This does not imply that the nineteenth century did not witness the onset of the teaching and adoption of modern sciences. But their effects remained very limited. This becomes all the more evident if the time before the late 1910s is compared with the period afterwards.

The contrast shows also in the changed postwar international position. After Anglo-Russian endeavors to effectively divide Iran into zones of interest (1907–19), following British as well as tsarist Russian occupation of parts of the country during the Great War, and in the wake of the aborted 1919 Anglo-Persian agreement, which would have granted Britain sweeping powers, Iran's international position underwent a decisive change. Reza Khān's 1921 coup d'état and subsequent state formation were underpinned by structural shifts. The USSR retreated from Iran and accepted its central government. British interests shifted from geopolitics (defense of India) to economics (oil). British interference abated; imperial troops were withdrawn and provincial leaders abandoned.<sup>64</sup> Britain's interests

became mainly economic, managed through the British Imperial Bank of Iran and the Anglo-Persian Oil Company.<sup>65</sup> Most important, the way was cleared for the rise of a comparatively strong central government, which created the institutional, financial, and legal frameworks vital to expanding the teaching, reformist application, and professionalization of modern scientific knowledge.

However, continuities existed as well. The central one was perhaps the enduring colonial character of modern Iranian science, that is, of the manner of its adoption. Here, the Iranian experience may be compared to that of other colonial states. Roy MacLeod has insisted on the difference between “‘colonial science,’ with its sense of structures, institutions, precepts and boundaries,” and “‘scientific colonization,’ a term that implies . . . a deliberate policy, with objectives and means to achieve [them].”<sup>66</sup> Seen in this light, modern science in Iran was not colonial, insofar as it was not under the thumb of a colonial power. A situation like that in India—where Englishmen and Indians sought a wide range of data useful for trade, political security, or scientists active in the metropole<sup>67</sup>—never materialized in semi-colonial Iran, which was situated at the periphery of intercontinental networks of data accumulation and scientific research. European scientific missions certainly visited the country in the nineteenth and twentieth centuries; missionary societies’ medical work involved the collection of meteorological and medico-geographical data; a Tehran-based Institut Pasteur opened in 1921; and so on. However, such activities occurred on a much lower level, in an intermittent fashion, and not under the direct political control of a colonial power. And while Iran received a dose of scientific colonialism—for example, in the form of European attempts to oblige it to participate in an international cordon sanitaire—the picture is ambiguous here too. Like other European powers, Russia and Britain called for concerted international efforts to prevent epidemics from spreading. At the same time, they were determined not to allow anybody else to use the issue to get a foot into the Iranian door.<sup>68</sup> Iran’s *de jure* political independence, courtesy of mutual Anglo-Russian deterrence, resulted in its *de facto* loss of full sovereignty. It also meant, however, that Iran was not subject to the comprehensive scientific colonialism typical of normal colonies.

However, in at least three senses, Iranians’ experience of science transfer may be called colonial. As with many colonies, but unlike Western metropolises, Iran’s experience with modern science was focused on modern education and practical application.<sup>69</sup> A few exceptions notwithstanding, it did not include original research. Higher education in natural sciences included some experiments, but these were not research-oriented. Until the opening of Tehran University in 1935, natural sciences were taught as preparatory classes for the study of medicine, and on offer at the Teachers’ Training College. Degrees in the natural

sciences did not exist.<sup>70</sup> In his 1931 proposal for Tehran University, commissioned by the court minister Teymurtash, Isā Sadiq asserted that “[T]he university will strive, as its first priority, to train the leaders and heads of the nation, and as a second priority, to engage in research.”<sup>71</sup> This stance was reflected in

the broad agreement to give priority to vocational over strictly academic education. The shah’s support of vocational education . . . tallied with the advice of foreign advisors, . . . [and of] many local educationalists . . . . Actual policy followed this overall line. The ministries of industry, roads, war, agriculture, health, communication, finance, mines each set up various vocational schools and technical colleges with the immediate purpose of training qualified staff. . . . From 1923 on, every concession to a foreign company was made conditional on its providing professional instruction for Iranian workers and students. . . . Yet [these schools’] standards remained low, and they developed at a much slower pace than the academic schools.<sup>72</sup>

One consequence of science’s focus on application and education in Iran was that the gap between Iranian modernizing professionals and the general modern middle-class public was much smaller than the differences in Europe between scientists and the bourgeois public.<sup>73</sup> Another result concerned the links between science, medicine, and technology. When the application of natural scientific and medical knowledge was so vital for the general experience of modern sciences, and the general discourse of science centered on just those fields, it is hardly meaningful to treat them separately. The Iranian case thus appears to support the validity of recent attempts to reexamine such links.<sup>74</sup>

Second, not only Iranians participated in the transfer of modern science. Westerners were involved as well. They were professors at the Dār ol-Fonun, colleges, and Tehran University; physicians and physician-missionaries; visiting scientists; employees of the Anglo-Persian Oil Company (APOC); and so on. Starting in the 1920s, their numbers declined and their work, except in the APOC, was state-regulated, partly in reaction to Iranian professionals’ demands that their competition be limited. Nonetheless, they remained significant actors at least up to the 1940s. Finally, modern science in Iran can be called colonial because of its role in the formation of a modernizing cultural identity. As I shall show in the next chapter, modernists negotiated between the universal science that originated in the West and a reconstituted “authentic” scientific culture of their own, using the latter to demonstrate a causal link between their past and the rise of modern Western science.

Following reform-related and international shifts, I now turn to a third, social factor behind the postrevolutionary rise in the importance of modern sciences: the decline of the Qajar court in the early twentieth century and the simultaneous emergence of a modern middle class as

the agent of modernist sociocultural work and the adoption of modern science. Throughout the nineteenth century, the court had initiated most novel cultural activities (e.g., photography, cinema) and been the center of applied scientific knowledge (e.g., in medicine and pharmacy). Toward the late nineteenth century, small groups of affluent urbanites started to adapt sociocultural activities. But it was the later rise of a modern middle class that put modernist sociocultural work on a firm foundation and popularized modern science. These two related developments can be examined through the press, where they are traceable through literature, architecture, and photography.

The “decline of the royal image”<sup>75</sup> in photography lucidly illustrates the waning of the Qajar court. It also documents the popularization of modernist cultural work beyond the palace walls. In the late 1850s, two decades after the daguerreotype camera was introduced at the Qajar court, Nāser al-Din Shāh began to develop a vivid interest in the camera. He set up studios at the Gulistan Palace and the Dār ol-Fonun.<sup>76</sup> His pictures materialized his self-image, customary for traditional Iranian kingship, as Pivot of the Universe. He took thousands of photographs of himself, his harem, his officials: “a visual cataloguing of the men who were at the service of the monarch, . . . their self-image overshadowed and their individuality dwarfed by [his] virtual presence. . . . [T]he formative years of Iranian photography (ca. 1850–1880) may be considered as the period where the photographs of Nāser od-Din Shāh dominated the visual space and his agenda dictated the use of the camera.”<sup>77</sup>

In 1869, the first public photography studio opened its doors in Tehran—right across the street from the palace. In the provinces, the local nobility and governors spread the new technology. At the time, princes and officials copied the shah as “the ideal model for portraiture.”<sup>78</sup> Emulation declined, and the royal image was implicitly undermined, when, in the 1880s, social groups other than the nobility started to patronize photography studios. As Tehran’s social structure shifted, “an evolved sense of self-image, separate from the king, [was] perpetuated.” It accelerated during Mozaffar al-Din Shāh’s reign (1896–1907) and was visible also in group portraits, for example, of “class-conscious” merchants.<sup>79</sup>

In the photography studios, “a sense of individuality is promoted and an ideal self-image is celebrated. [It] at times confirmed a rise in wealth within venues of the bazaar or conformed to an embracing of the West by the affluent families. . . . There was also a small, heterogeneous, active and articulate group . . . [that] found further prominence during the early decades of the twentieth century. They were to become the nucleus of a modern middle class. . . . Although a minority, they were to become the voice and political conscience of the country.”<sup>80</sup>

The royal image, tarnished since the late nineteenth century, was shattered by the Constitutional Revolution. Photographers stepped out of their

studios. Depicting events unfolding in the streets, they helped to mold a politicized “group identity”<sup>81</sup> linking social groups through joint action. The court had ceased to be the social hub of photographic production.

The constitutional movement, though for a short period of time, democratized photography in Qajar Iran. . . . The group photographs . . . present a single image . . . of protest and defiance. The target is the political system headed by the king. . . . [individual studio] portrait photograph[s] were [also] pitted against that of the king . . . join[ing] . . . the printed media and satirical caricatures to decisively erode the infallible royal image within the Iranian society.<sup>82</sup>

In the 1910s, revolutionary group pictures began to be used as postcards, a further indication that Iran now wished to be seen as the sum of its citizens rather than one person’s royal domain.<sup>83</sup> The decline of the royal image and the rise of the “kingly citizen”<sup>84</sup> concluded in the photographs of the last Qajar king, Ahmad Shāh (1909–25), which depict him as a public figure “less aloof and solitary than his great grand-father,” Nāser al-Din Shāh, with “the enhanced status of the elite apparent in their group portraits as they surround [him].”<sup>85</sup>

Turning to the press, it should be pointed out that since the mid and especially later nineteenth century, a small number of Iranian papers had been printed abroad or at the court. The latter “represented [the court’s] and the state’s official policy.”<sup>86</sup> The inexorable postrevolutionary decline of the court altered this situation. Modernizers and a reformist administration became the force behind a torrent of new titles. The content of the press shifted as well. Sociocultural and scientific issues rose to the fore, beginning in the mid 1910s. A decade later, the daily *Ettelā’āt*’s ads reflected a budding modernist urban culture. Books and bookshops; cinema and theater programs; private language and music lessons; portrait studios and Agfa film; British, American, and Italian cars; Swiss watches; British radios; household appliances like Singer sewing machines; foreign-produced drugs; pharmacies, physicians, and clinics were all advertised. *Ettelā’āt*’s edition exceeded 10,000 in the late 1930s, reaching a sizeable number of people in Tehran and the major provincial cities.<sup>87</sup>

Obviously, not all ads targeted the nascent modern middle class. Cars, for instance, were unavailable to its poorer members. But the modern middle class was the audience for popular scientific and socioculturally reformist articles. It was also the target of advertisements for scientific books. Announcing “the fourth book in the series of exact sciences [available] at the bookshop Ibn Sinā,” one ad stressed that “every teacher, physician, lawyer, politician, father and mother, and in fact every educated person needs to take a course in psychology.”<sup>88</sup>

Such ads embody the social dimension inherent in the rise of modern scientific knowledge. They document the parallel rise of a modernist

public and of modern science popularization, and underscore the aforementioned argument that the gap between Iranian modernist professionals and the modern middle class as a whole was smaller than that separating European scientists from the bourgeois public. Precisely because semi-colonial Iran's experience with modern science was by and large limited to education and application, professional and popular scientific texts and knowledge are not easily distinguishable.

Besides photography and the press, changes in literary output further testify to the decline of the Qajar court and the rise of an educated modern middle class central to modern sociocultural life. Starting at the royal court in the early nineteenth century, Persian literary reform was favored by contact with European and Russian literature. It was further aided by the introduction of the printing press (1816), which was instrumental in the opening of the Dār ol-Fonun translation office (1851) and the launching of the first court newspapers (1837, 1851).<sup>89</sup> In the second half of the nineteenth century, intellectuals like Malkom Khān, Ākhundzādeh, Tālebov, and Marāgheh replaced the court in pioneering literary reform.<sup>90</sup> Criticizing the court-based literature's convoluted, panegyric "Indian" style, they advocated stylistic change, moved away from poetry, wrote prose literature, and founded politically and socially critical newspapers in exile.

The revolution accelerated this process. "The traditional subjects—especially panegyrics—were pushed aside and new themes of social and political concern gained prominence. . . . change of content and the exhortative character resulted in a fertile interaction between the hitherto highly ornamented poetic language and the living, colloquial language."<sup>91</sup> "[W]ith almost no background of rigid rule, [prose] could develop faster and more easily keep up with new conditions." Authors like Said Nafisi considered prose "more necessary" for modern times.<sup>92</sup> A milestone was Jamālzādeh's short story collection *Yeki bud yeki nabud* (Once Upon a Time [1921]). The early twentieth century also witnessed the appearance in Iran of the historical novel.<sup>93</sup> The social novel followed. Drawing on earlier social critique, it was epitomized by Kāzemi's *Tehrān-e makhuf* (Terrible Tehran [1922]).<sup>94</sup> Both the historical and the social novel "were founded on a common conceptual basis, namely, the instructive attitude of literature. . . . The social novel represented a direct rejection of the present through candid criticism, as well as an attempt to draw a new picture of the future. At the same time, the modernization trend and the emergence of new social phenomena gave the novel new realms to deal with."<sup>95</sup>

Whereas "early social fiction" had focused on political causes of Iran's decay, and in the "early 1920s, social novels . . . continu[ed] to deal with political criticism," the picture started to change in the early 1920s. Literature began to home in on social and historical issues.<sup>96</sup> Although the

advent of Pahlavi autocracy hastened this trend, it basically corresponded to the long-term modernist shift of focus to sociocultural reform.<sup>97</sup> It is telling that the focal points of such reforms—women’s rights, prostitution, health, economic growth, family life, religion—were all taken up in literary texts.<sup>98</sup> These also reflected the modernists’ sometimes extreme aversion to lower and higher social groups; “the hero . . . very often belongs to the educated middle class.” Aristocrats were maligned, and the masses were, if treated at all, most often depicted as ignorant or bad-mannered.<sup>99</sup> “[T]he protagonist [of *Tehrān-e makhuf*] . . . is portrayed as a sympathetic middle class idealist who seeks social compromise . . . between . . . the ‘oppressive’ feudals and the ‘miserable’ lower classes.”<sup>100</sup>

The social orientation of literature points to the link between style and genre, and the shifting social conditions of literary production.

[T]he adoption of the novel in Persian literature accompanied the emergence and development of the modern bourgeoisie. It functioned as a literary vehicle for this new social class *vis-à-vis* the classical forms of literature, mainly poetry, which had been associated with the declining old aristocracy. . . . It was the new middle class that was associated with the realistic, satiric, and socially committed literature that has developed since the last decades of the nineteenth century. . . . [L]iterature, which had been emancipated from the court circle during the Constitutional period, confined itself again to another circle which was a little lower on the social ladder.<sup>101</sup>

In the classic social structure of literary production, poets had depended on individual patrons. Typically, these were courtiers, members of the royal family, or the shah. “Literature was naturally limited to topics related to the patron, the court life, royal conquests, etc. . . . Most people who read literature were . . . from the same class.”<sup>102</sup> The advent of the printing press in 1816 did “not signal the beginning of commercialization of Persian literature.” High illiteracy and semi-colonial conditions debilitated literary change as much as political reform and scientific innovation.<sup>103</sup>

Only in the late nineteenth century was high literary production commercialized and spread beyond the confines of the court. Reformist texts and newspapers were smuggled into Iran, some featuring “translations of European works of fiction . . . in serial form.”<sup>104</sup> This “economic dimension for the emergence of the novel”<sup>105</sup> deepened when the revolution irretrievably “deprived [the court] of its supremacy in favor of the people. No longer dependent on the court, the poet addressed his poetry to the vast number of people rather than to a limited circle of courtiers. . . . [T]he court [was abolished] as the center of gravity for the country’s cultural life.”<sup>106</sup>

In sum, by the start of the twentieth century, the Qajar court had lost its grip on literary production. The concurrent appearance of modernist

historical and social novels bears witness to the rise of the modern middle class as the new agent of literary and cultural production. Social novelists addressed problems worrying the modern middle class. Regarding production and financing, one might surmise that there were more printing presses and printing houses in the early twentieth century than in the nineteenth century. True, some authors could not find a publisher. But now, the alternative was “the arts and letters pages [*feuilletons*] of the daily press.”<sup>107</sup> The court and the court-controlled Dār ol-Fonun, which had formerly printed most books in Tehran, had collapsed. Finally, consumption patterns were shifting as well. The modern middle class formed an incomparably larger reading public than the court had been. The modernists were not only consumers of modern literature, but their views shaped its content. *Ettelāʾāt* regularly serialized books and short stories, reaching a sizeable, mainly modernizing public, and bookshops, many situated near Tehran University, frequently advertised in it.<sup>108</sup> In the early twentieth century, foreign bookshops and libraries opened in Tehran.<sup>109</sup> And a number of libraries were founded by Iranian modernists starting in the 1890s, often supported by donations from Western governments.<sup>110</sup>

The nineteenth-century Qajar court had set the tone, not only in photography, the press, and literature, but also in public and private architecture. There, too, the nobility and wealthy classes had followed its lead.<sup>111</sup> If regular Qajar courtyard houses, like the city, continued to “encompass an Islamic way of life,” the late nineteenth century witnessed an increasing interest in Western housing and furniture. Despite their very limited number, European-style houses were “first experiments with non-indigenous styles, [and] may be seen as transitional buildings.”<sup>112</sup> However, although the court was instrumental in initiating architectural changes, these remained limited until its last years. Innovation picked up momentum in the 1920s. Modern private row houses, apartment buildings, and townhouses differed from traditional homes in several ways. The partition between private and public (*andaruni-biruni*) became increasingly irrelevant; the garden was entirely absent in apartment complexes and lost its pivotal function in houses; there was a greater emphasis on “indoor spaces,” and “multi-functional space” was superseded by a number of smaller spaces used for specific, different purposes. Also, an increasing number of homes were supplied with electricity.<sup>113</sup>

Change was driven by new needs and convictions. An emerging modern middle class voiced new demands. And in marked difference from the press, literature, and photography, “the state was the most active patron of architecture” in the 1920s and 1930s, especially in the public domain. At the same time,

state architects quickly moved into the private sector. [They] built housing, especially for the growing urban middle class . . . who were among the first

to adopt the new way of life. Their numbers and their needs demanded solutions. . . . New technologies, new materials, and structural innovations replaced time-honored conventions. Fundamental principles of design . . . were altered. . . . New housing types arose: row-houses, apartment buildings, townhouses, . . . becom[ing] the most common housing type in Tehran from the late 1930s. The rise of the “professional” class who provided their services to the government in the daytime and practiced privately in the evening was the initial impetus for the creation of new houses of modest prices. A nuclear family had arisen to replace the patriarchal and extended family network. Doctors, engineers, teachers, clerks, and office workers were the new clients.<sup>114</sup>

The formation of a modern middle class deeply affected architecture. Here, too, the modernists’ new social needs and cultural preferences made them the Qajar court’s successor. Still, when the state flexed its muscles, architectural change was much more overwhelming. It “physical[ly] transformed the city [from] a private into a public one,” rupturing “the self-contained, concentric circles of house, *mahalla* (neighborhood) and city,” erecting a large number of modern public buildings, including ministries, banks, museums, and a university, and bulldozing into being a “network of broad avenues.”<sup>115</sup>

Together with changes in the discourse and practice of reform, shifts in the international context, and the formation of the modern middle class, the rise of a strong state apparatus was the fourth factor behind the growing importance of modern sciences. Its role was most crucial in education. High-school and university education allowed the modern middle class to acquire the modern scientific knowledge that distinguished it from other social groups. Modernists tirelessly advocated for the expansion of higher education in particular. At the same time, education’s institutional framework produced a special relationship with, and dependence on, the state.

Despite much planning during the revolution and the 1910s, the state did not overcome all the adverse circumstances Iran faced. Modern education remained gravely undersized. However, the “overall objectives of the educational system were defined and incorporated in legislation.” Reformist advocacy of education was translated into concrete policies with the rise of Rezā Shāh, who believed education could form citizens loyal to the state. Educational change was “the most impressive of civilian reforms. Between 1925 and 1941, the annual allocations for education increased in real terms by as much as twelve-fold.”<sup>116</sup> In 1922–23, there were 43,055 primary school pupils; by 1940–41, there were 287,244.<sup>117</sup> By 1940, all private and missionary schools had come under the control of the Ministry of Education.

As far as the state was concerned, the main motive for the expansion of education was a pressing need for trained staff. By the early 1940s, there

were 90,000 government employees.<sup>118</sup> Not accidentally, the number of colleges took off precisely when the state administration gained in size and power. Starting in the late 1910s, state ministries or agencies opened and reorganized a host of colleges.<sup>119</sup> Tehran University was founded in 1935, following Rezā Shāh's wish, which drew on the earlier plans of the precursor of the Iranian modern middle class, the tiny secular intelligentsia that had initiated secondary schooling in the late nineteenth century.<sup>120</sup> The government financed, supervised, and expanded secondary schools and colleges beginning in the 1920s.<sup>121</sup>

Moreover, it was for reasons of state, as much as in the interests of the modern middle class, that higher education enjoyed "effective priority" in Iran. It expanded more rapidly than elementary education. While the latter increased almost sevenfold from 1922–23 to 1940–41, the number of secondary school students increased ninefold, from 3,000 (1924–25) to 26,929 (1940–41). The number of college and university students grew elevenfold, from 300 (1925–26) to 3,367 (1940–41); moreover, since many Iranians studied abroad, the actual totals were even higher.<sup>122</sup>

. . .

This chapter has outlined the factors driving the rising importance of modern sciences since the late 1910s. I have analyzed the internal and international reasons—most crucially, a weak patrimonial court and semi-colonial dependency—by reason of which efforts to spread modern sciences and higher education in the nineteenth century remained limited and ultimately abortive. Conditions for the expansion of education and practical application of modern sciences ripened only in the 1910s. Worried about the failure of the nineteenth-century Constitutional revolutionary focus on political reform, the modernists turned to science-driven sociocultural reform. After they replaced the Qajar court as the main agency of modern sociocultural life and science adoption, a relatively strong state arose, and Iran's semi-colonial place in the international system shifted.

However, drawing on Roy MacLeod's distinction between scientific colonialism and colonial science, I have argued that, despite the absence of the former in semi-colonial Iran, the development of modern science in Iran remained, in certain key aspects, colonial even after the changes that took place in the 1910s. The next two chapters will demonstrate the importance of modern science for the cultural and professional bases of the modern Iranian middle class and shed further light on the colonial nature of science in Iran.

.