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INSTITUT PASTEUR
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INSTITUT PASTEUR

INSTITUT PASTEUR (PASTEUR INSTITUTE OF IRAN), the Institute for bacteriology and vaccination founded by the Persian government in 1921 as a branch of Institut Pasteur of Paris. The idea of establishing an institute for microbiological research and immunology in Iran was conceived in the aftermath of the 1918-19 influenza pandemic in Persia which killed hundreds of thousands of the country's approximately ten million population. With this bleak backdrop Firuz Mirzā Noṣrat-al-Dawla, then Minister of Foreign Affairs, who was serving as the head of the Persian delegation to the 1919 Paris Peace Conference, contacted the Institut Pasteur in Paris with regard to the establishment of an affiliated institute in Tehran to tackle Persia's public health issues. Following an agreement between the minister and the Institut, a French bacteriologist was dispatched to Tehran in 1920 to set up the Institute. The Institute was thereby officially inaugurated on 10 August 1921 (Afkhami, 2003b, pp. 367-92). The history of the Institute will be treated in four distinct phases: (1) formation and the first period of its activities, 1921-45; (2) the period of reorganization and progress, 1946-61; (3) the period of sluggish development, 1961-77; and finally, (4) the post-revolution-ary period from 1979 to the present.

FORMATION AND CONTRIBUTION, 1921-45

Mother Institute. Institut Pasteur, founded in Paris by the celebrated French microbiologist Louis Pasteur (1822-95) in 1888, was initially set up in order to minister to the victims of rabies, based on Pasteur's newly developed method of treatment. Supported by public contributions from around the world, the

Institute rapidly grew into a preeminent global center for research in the burgeoning field of bacteriology and vaccination. During the first few decades of the 20th century, the Institute was associated with such luminaries as Alexandre Yersin, Charles Laveran, Emil Roux, Albert Calmette, and Camille Guérin. A unique center of interdisciplinary research with its own lore and tradition, the Institute prided itself on creating a distinctive brand of scientist-scholar or *Pasteurian*, as they came to be known (Mercier and Wrotnoswska, passim; Geison, passim; René Dubos, passim; Delaunay, p. 186; Vallery-Radot, passim).

Earlier activities in Iran. The initial direct contacts with the Pasteur Institute dated back to the first decade of the 20th century, when its headquarters in Paris regularly supplied Persia's Sanitary Council (Majles-e ḥefẓ-e ṣeḥḥat; see HEALTH IN PERSIA iii.) with anti-diphtheria, anti-venom, and anti-tetanus vaccines, free of charge, through the intermediary of the French Legation in Tehran (Afkhami, 2003b, p. 387). In addition, a French veterinarian at the royal stables (Dr. Carré) had collaborated with Alexandre Yersin, the discoverer of the bubonic plague bacillus, at the Pasteur Institute of Annam in French Indo-China (Schneider, p. 28). Against this backdrop, it was logical that the Persian government would look to this renowned institution with a superb record of overseas work to establish its first enterprise in microbiological research and vaccine production in the country.

The agreement. Members of the Persian mission who prepared the groundwork for the agreement with Pasteur Institute in 1919-20 included Moḥammad-ʿAli Foruḡi Ḏakāʾ-al-Molk, Loqmān-al-Dawla, Dean of the Faculty of Medicine at the Dār al-Fonun, his brother Ḥakim-al-Dawla, and Maḥmud Khan, physician of Noṣrat-al-Dawla (Baltazard, 1948, p. 1). Although the members of the mission were acutely aware of the recent ravages of the 1918-19 influenza pandemic in Persia, the dangers of contagious diseases and particularly the need for reforms in Persia's public health was probably most closely felt in the mind of Noṣrat-al-Dawla, who almost lost his beloved father to the ravages of the 1918 influenza outbreak (Afkhami, 2003b, p. 380). As a result, it is not surprising that he was the most ardent proponent and most enthusiastic supporter of this scheme. In addition to efforts to establish the Pasteur Institute in Tehran, Noṣrat-al-Dawla personally approached the French Minister of Foreign Affairs for a list of candidates who could fill the new post of Professor of Bacteriology in Tehran to educate a cadre of Persian physicians in the new science of microbiology and laboratory analysis

(Archives of the United Nations, Geneva, Papers of Prince Firuz Nosratdoleh, Letter no. 173).

On 23 October, 1919, the Persian delegates met with Emil Roux, Louis Pasteur's successor, and Albert Calmett, the vice-director of the Institut Pasteur in Paris and 'father' of the BCG (Bacille Calmette-Guérin) tuberculosis vaccine. During the meeting, Noṣrat-al-Dawla emphasized that the Council of Ministers in Tehran and the shah himself had unanimously supported the endeavor to inaugurate a Pasteur Institute in Persia (Gilmour, 1925, p. 26). By January 1920, a conference was assembled in Paris that included the aforementioned Persian delegates and leaders from the Institute, including Professor René Legroux (1877-1951). During this conference, the program of the future Institute at Tehran was formulated. Joseph Mesnard (1860-1950) was named as its future director and charged with guiding the Institute during the first crucial years of its development. In April 1920, Mesnard received his contract, and several months later he arrived in Tehran (Baltazard, 1948, p. 1; Ghodssi, 1964, p. 34).

Formation of the Institute. Upon his arrival in Tehran in 1920, Mesnard set up the Institute in temporary headquarters, which were soon replaced by a donation of 10,000 m2 of land by Noṣrat-al-Dawla's Father, ʿAbd-al-Ḥosayn Mirzā Farmānfarmā, on which the facilities of the future Institute were built. Farmānfarmā also donated 10,000 tomans for the construction of the facilities, to supplement 15,000 tomans allocated by the government (Baltazard, 1948, p. 2). Mesnard inaugurated the anti-rabies service at the Institute and provided the vaccine and anti-toxin production groundwork which would allow the Institute to combat ongoing epidemics. In 1926, the Institute was led for a short period by Dr. Abu'l-Qāsem Bahrāmi, before the appointment of Jean Kérandel (1873-1934). Kérandel continued to serve as director until his untimely death in 1934. Following his death, Dr. Ḥosayn Maśʿuf took over the directorship of the Institute until 1936, when Professor René Legroux (1877-1951) was sent to Tehran with the title of Honorary Director of the Pasteur Institute of Iran. Legroux's capacity for tackling seemingly insurmountable administrative challenges and vast amounts of work was already legendary at the Pasteur Institute. During World War I, Legroux had put together the French Army Laboratory, which had allowed rapid diagnosis of bacteriological diseases and prevented many epidemics during the catastrophic war in Europe. Moreover, Legroux's commitment to undertaking cutting-edge and highly dangerous microbiological research was somewhat

shaken by the fact that he lost two of his most gifted students to the illnesses on which they were doing research (Vallery-Radot, pp. 3-7). As a result, it is not surprising that Legroux took on his task in Persia with gusto, and, although he only spent part of the year in Persia, his influence there was far-reaching. Legroux concentrated most of his efforts on the scientific undertakings at the Institute, spending several months a year in Persia, whereas the administrative aspects of the Institute were primarily managed by Dr. Abu'l-Qāsem Bahrāmi and Dr. Mehdi Ḡodsi (Ghodssi), who had spent several months at the mother institute in Paris and the Pasteur Institute in Morocco in 1936. The directors of the Pasteur Institute in Tehran were assisted by an administrative council composed of Moḥammad-ʿAli Foruḡi, Loqmān al-Molk, Ḥakim-al-Dawla, Dr. Qāsem Ḡani, Dr. Bayāt, and Ḥakim Aʿẓam, who was later replaced by Aʿlam-al-Molk (Baltazard, 1948, p. 2). In 1940, the Iranian government granted the Pasteur Institute an adjacent tract of land measuring 20,000 m2, thereby assuring the expansion of the Institute and allowing it to establish three large stables for the purposes of producing large quantities of smallpox vaccine as well as veterinarian buildings dedicated to the study of diseases such as rabies in dogs (Baltazard, 1948, p. 3).

REORGANIZATION AND PROGRESS, 1946-48

Following a request by the government of Iran at the end of World War II, the Institut Pasteur of France sent its president, Pasteur Vallery-Radot, and Professor Antoine Lacassagne, director of the Pasteur section of the Radium Institute of Paris and Professor at the Collège de France, in addition to Dr. Legroux, to Tehran to effectively reorganize and revitalize the Institute on the eve of its 25th anniversary. On 12 August 1946, the envoys from the mother institute, together with an Iranian commission including Dr. Mortażā Yazdi, Minister of Health and Hygiene, and his deputy, Dr. Aḥmad Rażawi, Dr. Manučehr Eqbāl, the outgoing Minister of Health and Professor of infectious diseases at the Faculty of Medicine of University of Tehran, Dr. Jawād Āštiāni, Professor of Hygiene at the Faculty of Medicine, and Dr. Amir-Aʿlam, founder of the Red Lion and Sun Society (Iran's then equivalent to the Red Cross/Red Crescent), formulated a new charter for the Pasteur Institute. The new charter strengthened the links between Tehran and the mother institute in Paris and reaffirmed the Persian government's commitment to the growth of its own Institute at a time when the Institute was facing a period of fiscal and administrative uncertainty. As a result, the Iranian government committed itself to taking total charge of the Pasteur Institute of Iran, including paying

the salary of the director and financing the construction of a new Institute supplied with the latest equipment. It is worth noting that the administrative and fiscal control of the Institute was entrusted to a Superior Iranian Council, composed of high-ranking government functionaries, such as the Minister and Deputy Minister of the Interior, deans and professors from the Medical Faculty at the University of Tehran as well as the Directors from the Rāzi Institute (a sister-institution of the Pasteur Institute) and the Institute of Parasitology and Malaria at Tehran. On the other hand, the scientific direction of the Institute was placed under the control of a scientific council composed of established Pasteurians, such as Pasteur Vallery-Radot, Jacques Tréfouel, René Legroux, Georges Blanc, and Antoine Lacassagne. In 1946, with the agreement of the Iranian government, the Administrative Council of the mother institute in Paris selected Marcel Baltazard (1908-71; FIGURE 1) as the new director of the Institute in Tehran and set a two-year deadline for the reorganization of the Institute. The Iranian government allocated an extraordinary budget for the revitalization plans of the Institute. By December 1948, the final version of the charter was ratified by the Iranian Parliament (Baltazard, 1948, pp. 4-9). The rejuvenation of the Pasteur Institute reflected a period of relative confidence and pragmatic aspirations in post-war Iran. The Soviet occupation of Azarbaijan had ended in 1946, and the future appeared bright, at a time when the science of medicine and disease prevention were advancing in leaps and bounds. During the 1940s, the occupying Allied forces had introduced Iranian physicians to penicillin, the ‘magic bullet’ against microbes (Bullard, pp. 252-53). Furthermore, the young Moḥammad Reżā Shah (r. 1941-79) and the Iranian Parliament were most probably acutely aware that the well publicized Soviet public health initiatives in the Caucasus had become an ideological challenge to the Iranian system of governance (Amir Alam, pp. 3-4). As a result, it is not surprising that the shah took personal interest in the revitalization of the Pasteur Institute in Iran (M. Baltazard, 1948, p. 13).

In the 1950s, the Administrative Council of the Institute included the shah (honorary president), the Court Minister, the Minister of Health, the vice-president of the Lion and Sun Society, the Deputy Minister of Finance, the deputy minister of Hygiene, the general secretary of the Red Lion and Sun Society, the Dean of the Medical Faculty at the University of Tehran (representing the University and the Minister of Education), the treasurer of the Red Lion and Sun Society, the Surgeon General (Director of the Health Services of Iranian Armed Forces and representing the Minister of War), Professor of Public Health at the Faculty of Medicine, Professor of Infectious

Diseases at the Faculty of Medicine, a member of the Public Health Committee of the Parliament, and the director of the Rāzi Institute (representing the Minister of Agriculture; Baltazard to Aublant, 28 February 1952 in Service des Archives, Institute Pasteur, Fondes d'Archives Marcel Baltazard).

Baltazard's reforms, 1947-61. Baltazard was eminently suited for the directorship of the Institute. He had already made his mark in the field of parasitology under the direction of Emil Brumpt at the Faculty of Medicine, University of Paris. Later, in 1933, he wrote his thesis on bilharzias in Morocco at the newly created Pasteur Institute in the country, winning the prestigious Prix de Thèse de l'Académie de Médecine for this work. Before coming to Iran, Baltazard had done extensive work on typhus and recurrent fever in Morocco. Consequently, Iran's public health challenges were ideally suited for this veteran bacteriologist. His first task was to direct the construction of the new Institute on the land granted by the government. The construction of the new buildings was an ongoing project that occupied the better part of ten years and was completed in three phases. The first phase involved the renovation of the old buildings, which allowed the Institute to continue to function while newer facilities were being built. The second phase involved the construction of service facilities, and the third phase, begun in 1949, involved the construction of buildings and laboratories that would replace the older renovated facilities. This phase involved the construction of a large, 45-room building that included laboratories, offices, and vaccination rooms with a large library (Baltazard, 1948, p. 13). The brainchild of Baltazard, this structure was functional and built along modern lines with artificial ventilation, an advanced air filtration system, and adequate insulation that would guarantee strict control of the temperature ranges that needed to be maintained for the advanced microbiological research conducted at the institute (ibid., pp. 16-23).

Aside from his scientific and administrative contribution to the Institute, Baltazard, the longest-serving director of the Institute, imprinted his own charisma, dedication to fieldwork, and strength of character on the Institution he had nurtured. His accomplishments in Iran continued to be periodically commemorated at the Pasteur Institute in Paris, and his dedication to the plight of lepers in Iran inspired Empress Faraḥ to give her assistance to de-stigmatizing the plight of these afflicted individuals in Iran (F. Pahlavi, "Testimonies"; Karimi, p. 60). Baltazard's concern for his fellow human beings transcended the realm of science. When rabies victims were brought to Tehran, "brutally uprooted, lacking all resources, and lost in the large city

where they could not find the calming intimacy of their villages," Dr. Baltazard founded a hospital for them where they could find both the indispensable treatments that they needed, and comfortable accommodation (Karimi, pp. 59-60). Baltazard's efforts confirmed the Institute's place in the pantheon of great institutes of microbiological research, most notably in the realm of plague research, where findings of the Institute helped shatter the long-held belief—particularly in the United States—that rodents were the sole vectors of bubonic plague (Baltazard to Aublant, 28 February 1952 in Service des Archives, Institute Pasteur, Fondes d'Archives Marcel Baltazard [1946-71]). Baltazard's theory stated that any species exterminated by a disease could not be the reservoir of the disease and that its true reservoir must be sought among those animals whose natural resistance allowed them to adapt to the infection. Thus, highly susceptible rodents, such as the rat, were not the reservoir of illness, but rather those highly resistant ones that survived the epizootic while the susceptible species died.

Baltzard's Research Projects: 1947-60. Between 1947 and 1960, a number of important projects were undertaken in the field of microbiology and disease eradication by the Iranian Pasteur Institute under the leadership of Baltazard. These projects included:

(1) The identification of the agent responsible for epidemics of recurrent fever which had emerged in Iran during the 1945-47 period. These outbreaks in Iran were part of a global pandemic, that had started in Tunisia in 1944. Led by Baltazard, Iranian scientists succeeded in isolating the *Spirochaeta recurrentis* bacterium as the responsible agent. They pointed to a native rodent as the endemic carrier of the infection. The fever eventually disappeared in 1953, however the Pasteur Institute in Tehran had played an important role in deciphering this illusive fever (Baltazard, 1947; idem et al., 1947; idem et al., 1948a; idem et al., 1948b; idem et al., 1950).

(2) Research was also carried out to identify and eradicate endemic reservoirs of bubonic plague in the Kurdish districts of Iran (idem et al., 1952). This had come about as a result of two plague epidemics that broke out in the Kurdish provinces in 1947. These outbreaks had added the burden of fighting an ongoing epidemic to the diverse activities of the already overstretched Institute (Ghodssi, 1964, p. 40). What was particularly intriguing about these outbreaks was that rats were largely absent from this region. Subsequently, the Institute was able to undertake a pioneering work to prove that the rat was by no means the only zoological carrier of the disease. Other wild rodents,

more specifically the gerbil-like meriones (*Meriones tristrami*), were credited with being both the carriers and the propagators of the dreaded illness. As a result of these outbreaks, Baltazard spearheaded the construction of a new annex to the Iranian Pasteur Institute in Akinlu Kurdistan known as Institut Pasteur de L'Iran, Laboratoire de Recherches, Manouchehr Gharagozlou, dedicated to the study of the plague in the Kurdish regions (Karimi, p. 55). The work at that institution went on for several decades under the leadership of Dr. Maḥmud Bahmanyār. These new discoveries in Iran "shattered traditional epidemiological notions" and set the basis for a new trend in international research on the natural reservoirs of the plague, which was subsequently funded by the United Nations' World Health Organization (WHO) with projects in India, Java (Indonesia), Syria, Turkey, and Iraq (Karimi, p. 58). Furthermore, for the first time in the Institute's history, the Iranian Pasteurians became collaborators in this international effort to isolate new foci of bubonic plague, working with microbe hunters in the aforementioned countries (Ghodssi, 1964, p. 40).

(3) In 1947, an outbreak of typhoid fever prompted the Iranian government to ask the Pasteur Institute to put its expertise to use in determining the special conditions in Tehran that had turned the capital into an ideal breeding ground for the disease. It was principally as a result of the Institute's research on this particular issue, as well as the discovery of the "lack of canalization of potable water," that the government took some of the first stringent measures to improve the capital's water system (Ghodssi, 1964, p. 40).

(4) In 1951, the fight against rabies was placed at the forefront of the Institute's activities. The Anti-Rabies Service of the Institute had been founded in 1941 and had treated over 325 individuals bitten by rabid wolves over the course of its 13 years of existence (Baltazard and Ghodssi, 1954). Cases of rabies were rampant in the wild, mountainous regions of Iran, and the WHO mandated the Institute to lead the trials evaluating the effectiveness of treatment of rabies victims by serum. In 1954, the Institute presented the results of its work, based on a group of 29 persons, of which 18 had been bitten by the same rabid wolf. The results of this work established the effectiveness of the anti-rabies serum (Baltazard and Bahmanyar, 1955). The dramatic attack of this rabid wolf on these villagers and the successful intervention of Baltazard and his team from the Institute captured the public imagination and was carried in news headlines around the world and prompted one French daily to declare that "Pasteur relives in Tehran," referring to Louis Pasteur's crowning success with

rabies' victims from Russia (Buhler, passim). The serum immunoglobulin had been used as a preventative against rabies both in France and Italy, but its efficacy had never been statistically demonstrated. However, this event allowed the Institute's team to demonstrate the dramatic results of the use of serum immunoglobulins, in addition to the vaccine. The classic treatment for rabies at this time was limited to serial vaccinations, and 5 villagers who were the least wounded received the vaccinations only; of the 5, 3 succumbed to rabies. This was in contrast to the 13 more seriously wounded individuals, who received both the serum immunoglobulin and the vaccine, of whom only 1 succumbed to the illness. These stunning results were the basis for a tabulated report to the WHO, which showed that from 1950-56, of the 370 individuals who were bitten in Iran, 12 percent succumbed to the disease, whereas only 1.5 percent of those with dual therapy died as a result of the illness (Baltazard and Bahmanyar, 1955, p. 747; Baltazard and Ghodssi, 1954, p. 797; Lepine, pp. 71-72).

(5) Another epidemiological issue that was addressed by the Institute was the question of the BCG (Bacille Calmette-Guerin) vaccine, which had been applied in Iran since 1947. In 1951, a successful epidemiological investigation of the vaccine led to the Institute's leadership of the international anti-tuberculosis vaccination campaign with the help of the UNICEF and the World Health Organization (WHO).

(6) In 1956, the Institute tackled the question of smallpox in Iran, and its work showed the need for a concerted national campaign to eradicate this disease. Subsequently, the first national campaign against smallpox in the world was inaugurated in Iran, led by the Ministry of Health's smallpox division, which resulted in the elimination of the dreaded disease from Iran within four years (Ghodssi, 1964, p. 9).

(7) In the same year, with the help of the WHO and Iran's Health Ministry, the Institute inaugurated an anti-tuberculosis campaign that included a systematic study and classification of resistant strains of the Tuberculin Bacillus. In 1957, the problem of leprosy, too, was successfully tackled by the Institute, once again with the assistance of the WHO (Ghodssi, 1964, p. 42).

(8) Baltazard and the Institute also played a seminal role in shaping the research of Carleton Gajdusek, winner of the 1976 Nobel Prize in Physiology and Medicine. Gajdusek worked at the Institute with Baltazard on rabies, plague, arbovirus infections, and other epidemic diseases between 1952 and

1953. He acknowledged his debt to Baltazard and his colleagues in Tehran for having taught him the "excitement and challenges offered by urgent opportunistic investigations of epidemiological problems in exotic and isolated populations," leading to his Nobel Prize winning work on Kuru (*spongiform encephalitis*) amongst remote cannibals in New Guinea (Gajdusek).

(9) Laboratories founded in the new building of the Institute (inaugurated in 1958) allowed Baltazard and his team to undertake to create an epidemiological map of viral diseases in Iran though the study of thousands of human serum samples collected throughout the country. In this endeavor, Baltazard was joined by several collaborators who formed a "virology working group" based in Iran. These included Theodore Woodward, of the University of Maryland and Joseph Smadel of the Walter Reed Institute. The aforementioned Gajusek joined this group as a young man, spearheading the collection of samples across the country. Once collected these serums were sent to Baltimore, where they were analyzed. This work allowed Iranian researchers to estimate the frequency and localization of enteroviruses in Iran, particularly the virus of Poliomyelitis, that of hemorrhagic fever, rickettsial viruses, and arboviruses (Ambassade de France en Iran, 2004, pp. 21-22).

(10) Throughout the 1950s and well into the 1960s, the Institute also tackled other urgent epidemiological questions, such as the prevalent problems with rickettsial diseases or viral illnesses that were prevalent in the country. This work was done in collaboration with the University of Maryland, with which the Institute had a longstanding relationship. With the arrival of Dr. A. Boué from the mother institute in France in 1956, a virology service was inaugurated at the Institute (Ghodssi, 1964, p. 41). This section quickly established itself at the frontlines of microbiological research when the first tissue cultures containing the smallpox virus were developed. Subsequent work included extensive research on the state of poliomyelitis in the country. WHO also appointed the virology section as an international surveillance center for influenza (Ghodssi, 1964, p. 41).

PERIOD OF SLUGGISH DEVELOPMENT, 1961-77

In 1961, Baltazard completed his third five-year contract with the Institute and voluntarily stepped down from his position as director, nominating one of his protégées, Dr. Mehdi Ghodssi to lead the Institute. However, even after stepping down, Baltazard's influence on, and commitment to, the Institute

were unwavering. Baltazard, a dedicated Gaullist, whose father had been a fellow prisoner with Charles de Gaulle in Bavaria during World War I, managed to convince de Gaulle during his presidency to visit the Institute in 1963 (Karimi, p. 55). This visit enforced the importance of the Pasteur Institute in maintaining the traditional importance of French scientific culture in Iran. From Mehdi Ghodssi's tenure onwards, all the directors of the Institute were Iranians. Ghodssi's time in office lasted until 1969, when he was replaced by Moṣṭafā Nāmvari (1969-71), who was in turn succeeded by Ṣabbār Farmānfarmāʾiān, who directed the Institute until 1977. However, the Institute during the 1960s and 1970s was characterized as "lethargic" by observers from the mother institute in France (Chambon, p. 1). This view was probably motivated in part by the fact that the Institute had progressively moved away from the mother Institute's control, becoming increasingly "Persianized," thereby arousing the ire of the "traditionalist" French Pasteurians. For Iran as a whole, on the other hand, the 1970s marked a period of rapid growth and industrialization, fueled by petrodollars, allowing the shah to have in sight the fruition of his White Revolution and the prospect of seeing Iran, still a developing country, becoming one of the five world powers by the year 2000. To achieve his vision, the shah launched a number of "mega-projects" in various industrial and technological sectors. During these years, Iran made some important gains in the field of biomedical science with the inauguration of a number of research institutions, including the Center of Cellular and Molecular Biology under the direction of Fereydun and Lisa Jawādi, the Imperial Medical College of Iran, led by Dr. ʿAbd-al-Ḥosayn Samiʿi, the Bu-ʿAli Sinā University led by Farhāḍ Riāḥi, and the field of biological radioisotopes at the Center for Atomic Energy, led by Akbar Eʿtemād. It was within this progressive environment that in 1975 Jacques Monod, the director of the Pasteur Institute in Paris and Nobel Prize Laureate in Medicine of 1965, visited Iran as a goodwill ambassador from the mother Institute. He also sought to use his visit as a means of confidential information gathering on the state of biomedical research in Iran (Chambon, p. 3). Monod had several meetings with the prime minister, Amir-ʿAbbās Hoveydā, and Dr. Manučehr Eqbāl, director of the National Iranian Oil Company (NIOC), and was also received in audience by the shah. The shah himself assured Monod of his interest in the role that the Pasteur Institute could play in Iran in the domain of medical research and public health (ibid., p. 3). Hoveydā took the lead in these negotiations for a deeper involvement of the Pasteur Institute in Iran's biomedical sphere. Early in the course of the negotiations, the rivalry between the 'anglophiles' and their penchant for American biomedicine and the

'francophiles' threatened the progress of this new undertaking. However, Hoveydā's personal intervention brought these quasi-ideological differences to a rapid close. Amongst the issues that were hotly debated at this time was the subject of the leadership of the Iranian branch of the Institute. The French apparently placed much of the blame for the Institute's stagnation on its leadership. Another issue was the recruiting drive on the part of the Iranian negotiators, to import a large number of highly regarded French researchers from the mother Institute in Paris and install them in Tehran to establish a vaccination production program that would make Iran self-sufficient in this area and allow the Institute to export vaccines. The controversy lay in the fact that it would be difficult to displace researchers in the midst of their work. Many of them were not inclined towards living overseas (Chambon, p. 75). In spite of the French qualms and Iranian "tenacity," the negotiations culminated in the formulation of an action plan "for the renovation and the development of the Pasteur Institute of Iran" (ibid., p. 85). It was based on four principles for the functioning of the Institute: (1) Biomedical research in the Pasteurian fields that included bacteriology, virology, parasitology, and immunology, insofar as they were related to public health issues in Iran, but with the ambition of achieving progressive fundamental research of international import. (2) Activities of scholarly import and epidemiological surveillance in liaison with the Iranian Ministry of Health and the WHO. (3) Training of Iranian researchers in the six Pasteurian fields. (4) Application of the aforementioned research, including the production of serum vaccines and laboratory reagents.

REVOLUTIONARY ERA THE 1980s-1990s

Revolutionary crisis. The 1977-79 revolutionary crisis did not spare the Institute. From 1979 until October 1980, no fewer than four different directors were put in charge of the Institute, and the post of leadership was vacant for the first four months of 1980 (Dedet, p. 63). Subsequently, ʿAli Ravāni assumed the directorship between 1980 and 1982. This was followed by a nine-year tenure by Aḥad Milāniniā, who brought some stability to an organization that had suffered through the impact of social and internal political upheavals and the subsequent exodus of many of the country's leading scientists in the fields of microbiology and epidemiology. Milāniniā was followed in office by Moḥammad-Reżā Zāli, who, in turn, was succeeded by the organization's present director, Mortażā Āḏarnuš (Dedet, p. 64).

Development in the 1990s. The Institute had reached a new milestone in its

development, engaging itself in research, education, and production in the 1990s. The research branch of the Institute was divided into four distinct groups: the Microbiology Group, the Biotechnology Group, the Clinical Research Group, and the Provincial Research Stations. The Microbiology Group included the bacteriology department with its focus on the study of upper respiratory tract and urinary tract infections, including research into mycoplasma, culture collection, as well as the typing of Borrelia and Shigella plasmid profiles. The Microbiology Group also looked at drug-resistant tuberculosis and mycoplasma pneumonia (atypical). The Parasitology Department within the Microbiology Group focused its research on toxoplasmosis, leishmaniasis and malaria. The Mycology Department, also part of the Microbiology Group, looked at fungal diseases, whereas the Virology Department, also part of the Microbiology Group, does research on neurotrophic viruses, measles, and rubella. A hepatitis and AIDS department also exists within the Microbiology Group, and an active rabies department continues its dynamic existence within the rubric of microbiology. (The Pasteur Institute of Iran maintains also an informative website; see *http://www.pasteur.ac.ir*. The early history of the Institute and the pioneering achievements of Baltazard, including some archival material, have a special site created by his widow, Suzane Moner-Baltazard; see *http://www.pathexo.fr/Balta.html*.)

Current activities. At present, the Biotechnology Group is working on a number of projects in biotechnology, medical genetics, and molecular microbiology, including the pathologic mechanism of diarrheagenic bacteria, and is also involved in the production of restriction enzymes. The Biochemistry Group is also involved in the production of hepatitis B vaccine and the preparation of immuno assay kits. The Immunology Department focuses on leishmania immunology. In 1994, the newly reorganized vaccination department worked on the development and production of a number of vaccines, including tuberculosis, hepatitis B, rubella, rabies, diphtheria, tetanus, polio, measles, cholera, and yellow fever.

An overall assessment. The strength and continued growth of the Pasteur Institute in Iran is a testimony to the French contribution to Iranian medicine. Its existence rests on the labors of a group of scientists, both French and Iranian, who were aware of the important role that a clinical research institute could play in the advancement of public health in Iran. However, more than anything else, the Institute provided the essential foundation for

the development of an investigative, laboratory-based, biomedical culture in Iran, and its influence and contribution spread far beyond the boundaries of its mandate, eventually shaping research in its field on an international level.

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