
*Medicine and power
in Tunisia, 1780–1900*

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Contents

<i>Acknowledgments</i>	ix
<i>Note on transliteration</i>	x
<i>Abbreviations</i>	xi
Introduction	I
Method and approach	I
Plague, cholera, and typhus	3
Arabic and European concepts of epidemic disease, c. 1800	7
1 Indigenous medicine against plague, 1780–1830	14
Indigenous public health and medicine	14
Communal responses to plague, 1784–1820	24
Social and economic consequences of plague, 1780–1830	32
2 Cholera in an age of European economic expansion, 1830–58	40
Cholera, 1849–50, and Ahmad Bey’s anxiety	44
Cholera, 1856, and an anti-European Bey	59
Social and economic consequences of cholera, 1830–58	60
3 Cholera, typhus, and economic collapse, 1858–70	65
Cholera, 1867, aftermath of revolution	69
Typhus, 1868, prelude to bankruptcy	78
Social and economic consequences of the 1867–8 epidemics	81
4 Colonization and collapse of Arab medical institutions	83
Transition from Muslim to European medical authority	83
Expansion of European empirical medicine	88
Muslim medical reforms	90
Medicine and colonial domination	92

Contents

Conclusion	97
Mortality and history	97
Epidemics and social change	98
Epidemics and medical reform	99
Medicine and political legitimacy	100
APPENDIX A Waqf (hubus) document for the maristan of Tunis	102
APPENDIX B Letter from Husayn Bey to de Lesseps on reasons for the quarantine	106
APPENDIX C Epidemics and population trends	107
Population size	107
Population trends	108
<i>Notes</i>	114
<i>Glossary</i>	131
<i>Bibliography</i>	134
<i>Index</i>	143

Illustrations

Map 1	Tunisia	xv
Map 2	The contemporary medina of Tunis	xvi
Fig. 1	Medicinal herb shops	15
Fig. 2	Ijaza issued in 1818 to Muhammad b. Muhammad al-Kilani by Muhammad b. al-Hajj Hasuna bu 'Asida	18
Fig. 3	Maristan of Tunis	20
Fig. 4	Monthly budget of 'Aziza 'Uthmana Waqf	23
Fig. 5	Ijaza issued in 1861 to al-Hajj b. 'Abd al-Karim al-Siba'i al-Maghribi by Muhammad bu 'Asida	84
Fig. 6(a)	Part of a petition testifying that al-Nafti has practiced medicine in the Djerid for years without harming anyone	85
Fig. 6(b)	Ijaza issued in 1862 to Muhammad b. Tabib al-Nafti by Abraham Lumbroso	86
Fig. 7	Sadiqi hospital	91
Fig. 8	Statistics compiled by Dr Lumbroso during the cholera epidemic of 1849–50	110

Introduction

Method and approach

At the beginning of the nineteenth century, Louis Frank, a French doctor practicing in Tunis, found that he had to stay on good terms with the Muslim chief of physicians to practice European medicine without difficulties. At the end of the century, Hamda b. Kilani, a Muslim doctor and son of the former chief of physicians of Tunis, found that he had to be classed as *médecin toléré* (a second-class medical status) by the French medical authority to practice Arabic medicine at all. Why the change in power?

The answer emerges in the long struggle between Arabic and European medicine that accelerated with European economic expansion. The intricacies of the medical confrontation are best seen through the history of the major epidemics that struck the people of Tunisia between 1780 and 1900. The epidemics threatened the lives of vast numbers of people and called forth responses from all levels of society: ordinary people, medical personnel, religious authorities, and the political and commercial elite. The process of medical change revealed by the epidemics can only be studied meaningfully against the political, social, and economic realities of the times.

In Tunisia, the shift from Arabic to European medicine was a fundamental part of the colonial experience. The suspicion of the Muslim elite that European science contained superior sources of knowledge and therefore of temporal power led them to reconsider long-held medical concepts and to undertake a reform program with both enthusiasm and misgiving. The indigenous government adopted new policies regarding disease and its prevention during the intense struggle between Muslim and European civilization. Toward the end of the nineteenth century, French colonialists in Tunisia came to see medicine as a fundamental tool of their 'civilizing mission' which could, through its humanitarian results, serve the political interests of France.

While medical subjects rarely appear in standard sources – Arabic

Medicine and power in Tunisia

chronicles, consular letters, and archival materials – records of epidemics were often considered important enough to be written down and saved. Quarantine notices, commercial registers, and military reports from provincial authorities all contained occasional references to outbreaks of epidemics. In addition, most travelers mentioned epidemics that occurred during their travels, and European doctors practicing in Tunisia wrote books and articles about their experiences with them. From these primary sources emerges a story of social struggle not only with disease but with the new challenges presented by European expansion.

Earlier medical historians occasionally traced the course of an epidemic, justifying their projects by the intrinsic interest in one aspect of local history or, in a wider sense, of the human experience. In recent years, however, social historians have begun studying epidemics, using new theoretical approaches which combine ecological, epidemiological, medical, and demographic information with more conventional historical source materials. Most studies of epidemics contain several analytical approaches to the material, but three major historical approaches can be distinguished.

The first views disease and especially epidemic diseases as causative agents in history, resulting in the fall of empires and the decline of civilizations. William McNeill, in his *Plagues and Peoples* (1976), theorizes that smallpox facilitated the Spanish conquest of the Americas because the Amerindians, seeing the Spanish survive while they themselves were decimated by the mysterious disease, may have concluded that the enemy possessed special magical powers. The author expands his observations, speculating on the varied effects of infectious diseases on the course of human affairs worldwide and over long periods of time. Michael Dols, in *The Black Death in the Middle East* (1977), advances the thesis that the plague of 1347 and its resulting population decline led directly to the crises of the Mamluk Sultanate in the later fourteenth and fifteenth centuries. Historians of medieval Europe have extensively debated this issue: the many facets of the argument are summarized in W. Bowsky, ed., *The Black Death: A Turning Point in History?* (1971). The debate on plague and its historic consequences is one aspect of a larger dialogue on whether or not demographic forces are the fundamental ones in historical change.

The second approach sees epidemics as mirrors or magnifying glasses reflecting and revealing underlying social forces and conflicts and changes in values and attitudes that might normally escape the historian's eye. Louis Chevalier, for example, in *Classes laborieuses et classes dangereuses à Paris pendant la première moitié du XIX^e siècle* (1958), portrays social tensions and resentments in France through the cholera

riots that occurred in the poorer quarters of Paris, where the disease struck most severely. Charles Rosenberg, in *The Cholera Years* (1962), traces the 'dissipation of piety' and the development of a 'positivistic temper of thought and expression' in the United States through the cholera epidemics that struck in 1832, 1849, and 1866. Carlo Cipolla, in *Cristofano and the Plague* (1973) and *Faith, Reason, and the Plague in Seventeenth-Century Tuscany* (1979), depicts the emotions, attitudes, and behavior of various segments of society in seventeenth-century Italy through the communal responses to plague.

The third approach demonstrates changes in medical theories and practices as seen through and resulting from societal experience with epidemics. Severe diseases call for some sort of medical action; how and why do medical ideas change over time? Roderick McGrew's *Russia and the Cholera* (1965) describes the development of liberal, sophisticated medical writings that paralleled developments in contemporary Russian literature through the events of the cholera epidemic of 1823–32. Margaret Pelling, in *Cholera, Fever, and English Medicine, 1825–1865* (1978), traces the intellectual development of epidemiological theories in England that led to public concern about medical dilemmas previously thought private.

These three approaches to epidemics and history are all included in the following study. The first approach, regarding the role of mortality as the determinant of historical advance or decline, is critically evaluated following discussion of the epidemics. The second approach, illustrating the internal dynamics of a given society through popular response to epidemic disease, reveals Muslim and European communal relationships that shifted as the balance of economic and political power changed. The third approach, discussing medical development through a society's experiences with epidemics, shows how the epidemics hastened the transition from Arabic to European medical institutions. Moreover, European-style medical reform, completed in Tunis at governmental levels by 1900, was used as a major justification of the colonial system that operated in North Africa.

Plague, cholera, and typhus

In the Muslim world and in the West severe epidemic diseases periodically swept across the land terrorizing and decimating the inhabitants. Each civilization tried desperately to protect itself against such diseases but until the late nineteenth century, Muslim and European medical efforts alike generally proved futile. Medical ideas about epidemics in both regions originated from religious concepts of causation, empirical obser-

vations, and Greek and Islamic scholarly traditions. Ideas concerning prevention and treatment were often contradictory but remained relatively constant from antiquity until the nineteenth century, when positivist scientific inquiry and new political and social interests largely negated them. The three epidemic diseases that struck Tunisia most severely during the period under study, 1780–1900, were plague, cholera, and typhus. All three caused fundamental rethinking of received tradition on the part of the Muslim elite in the context of European scientific, commercial, and political impact.

By 1800 plague to most Europeans was a distant memory associated with medieval times. The last major epidemic in England had occurred in 1664–5 and was immortalized by Daniel Defoe in *A Journal of the Plague Year* (1722). Marseilles was stricken by severe plague epidemics in 1705 and 1720 but after that time the disease seemed to disappear from France. It lingered on, however, in North Africa and the Middle East until the early nineteenth century and in the Far East until the early twentieth century. With its horrifying symptoms, high fatality rates, and massive epidemic nature, plague gripped the popular imagination. Arabic and Latin medical manuscripts had lengthy sections on plague, whereas other diseases were often less extensively discussed. Plague struck the Middle East and Europe with equal severity, and each region had long-standing philosophical controversies and medical theories concerning the proper method of defense.

Bubonic plague, the most common form of the disease, is characterized by swelling of the lymph nodes (buboes, in the armpits and groin), blackening of the skin, fever, chills, nausea, and delirium. Its cause was unknown until 1894, when the bacillus, *Yersinia pestis*, was discovered nearly simultaneously by two researchers working independently in Hong Kong, Alexander Yersin and Shibasaboro Kitasato. Although people often noticed rats dying in large numbers prior to an outbreak of plague, no one suspected the connection. Now it is known that fleas, especially rat fleas, are generally responsible for the transmission of bubonic plague. From time to time rodent fleas become infected and transmit the disease to their hosts, such as rats or squirrels. The hosts die and the fleas seek other hosts, including human beings.

Two other forms of plague are also caused by *Yersinia pestis*. Pneumonic plague is contracted when the bacillus is transmitted directly from person to person by means of the respiratory channel. Septicemic plague results when the bacillus is introduced directly into the bloodstream by fleabite. In both forms the characteristic buboes are absent, confusing diagnosis, and fatality rates are higher than for bubonic plague. Pneumonic and septicemic forms sometimes appeared during severe bubonic plague

epidemics. In the 1930s and 1940s it was learned that plague is susceptible to antibiotics such as streptomycin and tetracycline.

Why plague has disappeared in epidemic form in modern times is a matter of controversy. Among the explanations are improved quarantine procedures that prevent contact with infected persons, cotton, or grain; improved building procedures that reduce the proximity of rats to man; a shift from the black house rat to the less domesticated brown rat; public rather than private storage of grain, which reduces contact with rat fleas that breed in wheat chaff; an increase in human immunity to *Yersinia pestis*; increased human resistance through improved nutrition; and medical advances that effectively isolate and treat the infected. Each explanation can be partially disproved by detailed local studies, though perhaps their cumulative effects have been decisive to date. A complete and satisfactory explanation of the recent absence of plague epidemic has yet to be made.¹

Two major plague epidemics struck Tunisia during the period covered by this study, in 1784 and 1818. Each lasted for many months, devastating the populace, but no plague has occurred since. Chapter 1 deals with these two epidemics and their social and economic consequences in the historical context of the time.

Cholera, the second disease considered in this study, was the most dreaded disease of the nineteenth century. Cholera had apparently existed endemically in India for centuries. In 1817 it began to spread to other regions in epidemic form, perhaps aided by improved means of transportation developed during the Industrial Revolution. In 1817 cholera reached the Arabian peninsula, Iran, Turkey, southern Russia, Thailand, and Japan. Everywhere it killed thousands, with whole families succumbing within hours or days. By the mid-1820s the disease had spread through central Europe and appeared in England in 1831 and in the United States in 1832. Some six pandemics, or world epidemics, struck during the nineteenth century. Mecca and Medina, centers of pilgrimage from India, southeast Asia, the Middle East, and Africa, were important centers of cholera transmission.²

Like plague, cholera is a fearful disease. It strikes its victims suddenly: within hours a healthy person falls ill and experiences uncontrollable vomiting and diarrhea. In extreme cases, the skin color turns from blue to black as the victim dehydrates and appears to age before one's eyes. Fatality rates in the nineteenth century were between 40 and 60 percent in most regions. No known medical treatment was successful against the new disease. Traditional treatments such as bleeding and new remedies such as electric shock were tried in vain. In Tunis, as in many European cities, people sometimes suspected doctors of spreading the disease to kill

off poor people, or of being in the pay of the government, which hoped to divert attention from opposition to it by creating public alarm. Hospitals and doctors' care were widely feared as sure sentences as death. Cholera killed by dehydrating its victims, and the bleedings and purges prescribed by doctors were thought to hasten death.³

Cholera caused a crisis of confidence in the nineteenth-century European medical profession, then in the midst of the Scientific Revolution, and precipitated an avalanche of publications reporting investigation of the disease. New medical efforts to treat cholera, however, failed. Despite the unknown cause, the connection between poor sanitation and the incidence of cholera soon became apparent. In London in 1854 the contagiousness of the disease, much in dispute at the time, was convincingly established during a localized outbreak. John Snow, a medical doctor and researcher, went to the scene of the outbreak and learned that all of the victims had drunk from the same well. He removed the pump handle and the epidemic stopped. The cause of the disease was not determined for another thirty years, when Robert Koch isolated the causative bacillus, *Vibrio cholerae*, in Egypt. Snow's discovery and similar observations elsewhere stimulated public health reforms in European and Middle Eastern cities.⁴

Today, cholera patients usually recover with rehydration often aided by antibiotics and general hospital care. Epidemics still strike the Mediterranean and other regions of the world, however, occasionally impeding travel, and if immediate medical care is not obtainable, causing deaths.

Cholera has invaded Tunisia many times; the most severe epidemics during the period under study came in 1849 and in 1867. Cholera was a new disease to Muslims and Europeans, and each group hoped to learn the means of prevention and treatment from the other. Chapters 2 and 3 discuss the events of these major epidemics and the dialogue among political and medical authorities who tried to deal with the crises on their own, often conflicting, terms.

Typhus, the third disease considered in this study, first spread in Europe in epidemic form during the wars of the fifteenth century. It is commonly found among those unable to avail themselves of normal hygiene – prisoners, refugees, and military troops. The disease was particularly virulent during the Thirty Years War of 1618–48. Typhus was responsible for the deaths of most of the 600,000 troops lost during Napoleon's famous retreat from Moscow in 1812–13.

Symptoms of the disease include a spotted rash, nausea, chills, and fever. The fatality rate ranges from about 5 percent among children to 25 percent among young adults, and 50 percent among the aged. Charles

Nicolle discovered the mode of transmission while working in the Sadiqi hospital of Tunis in 1909. He noticed that patients recently admitted to the hospital spread the disease to others but that once patients were bathed and their clothing changed, no more cases occurred. He surmised that the body louse was the vector, and additional experimentation confirmed his observation. The causative agent, a virus, was discovered by Stanislaus von Prowazek in 1914 and by Henrique da Rocha-Lima in 1916. The virus was named *Rickettsia prowazekii* after von Prowazek and Howard T. Ricketts, who died investigating the disease. In 1939 the insecticide properties of DDT were discovered and the chemical was widely used as a delousing powder by Allied troops during World War II. Today typhus patients usually recover with symptomatic treatment, proper nutrition, and hospital care.⁵

Typhus appeared frequently in Tunisia; owing to its association with the famine and cholera which preceded it, the epidemic of 1868 was exceptionally destructive. This epidemic, which is studied in Chapter 3, followed the famine and cholera of 1866 and 1867 and directly preceded bankruptcy and the beginning of direct European economic domination.

Arabic and European concepts of epidemic disease, c. 1800

Prior to the twentieth century, effective treatment of these diseases remained a mystery. Since earliest times, however, people tried to find ways to deal with such threats to life. Muslims and Europeans alike tried preventive and curative measures based on empirical observations, ancient medical theories, and religious traditions. Evil spirits were widely suspect as the cause of epidemics. Genies that pricked victims with plague-poisoned arrows figured in the Old and New Testaments and in the Quran. Until the end of the eighteenth century, the wearing of amulets during time of plague was common throughout the Middle East and Europe. Muslims and Christians sometimes considered plague a punishment for sin requiring prayers and invocations for deliverance.

During the Black Death of 1348, it was clear that plague spread from region to region and port to port. Trading cities of the Italian peninsula, in frequent contact with other regions, began to institute quarantines on ships and land and sea travelers, isolating the sick and disinfecting cargoes. By the seventeenth century, many European cities had adopted some form of quarantining when plague was announced elsewhere.⁶ In the Ottoman Empire the practice was less prevalent, but Istanbul and Tunis had quarantined ships since at least the early eighteenth century.

Arabic medical theories in 1800 were derived from two major sources of medical authority: Galenic (Greek)–Islamic medicine and prophetic

medicine. Galenic–Islamic medicine, exemplified in the writings of Ibn Sina (d. 1037), held that disease was caused by an imbalance of the four humors of the body: hot, cold, moist, and dry. The primary elements in the balance were blood, mucous, yellow bile, and black bile, respectively, matters of the four humors. An individual had a characteristic humoral balance manifested as a sanguine, phlegmatic, choleric, or melancholic temperament according to the predominant humor. When illness struck, the balance was upset and the doctor's role was to correct it. In early-nineteenth-century Tunis, for example, a Muslim doctor once diagnosed a fever which he thought was caused by 'accretion of blood in the pituitary'.⁷ The remedy was to remove the excess blood by bleeding the patient. Excess phlegm could cause 'cold' illnesses like influenzas, for which hot foods were prescribed.

In eighteenth-century North Africa hot foods such as ginger, pennyroyal, garlic, nutmeg, cloves, honey, and nuts were thought to quicken the blood and to loosen the joints. Cold foods such as vinegar, cucumbers, oranges, watermelons, and turnips made the skin cool and the body still. For a general fortifier, hot foods such as honey, milk, and ground sesame were boiled, filtered, and taken each morning. For 'epidemic fever' one took cooling herbs or roots. For extended fevers, one ate bread made of barley and wheat and drank a potion of ground bark and pomegranate leaves mixed with sugar extracted from ground ginger, hummus (chick-peas) boiled with mastic, and lupin. The patient's room was filled with vapors of burning willow leaves to disinfect the air.⁸

Prophetic medicine, the second major influence in eighteenth-century Muslim medical theory and practice, was based on medical customs prevailing in Muhammad's time in the towns and deserts of the Arabian peninsula. Such practices were sanctified in numerous sayings and traditions (*hadiths*) about the words and deeds of Muhammad and his family and companions. In one famous hadith the Prophet acknowledged three cures: honey, scarification, and cautery.⁹ In other hadiths, a black grain (possibly cumin), Indian aloes, and camel's milk and urine are mentioned as remedies and were widely used by Muslim healers. Scarification and cautery became basic surgical treatments throughout the Islamic world.¹⁰

Scarification was performed by first applying surface pressure to cause the skin to swell; then a small knife with a long curved blade heated red hot at the tip was lightly touched repeatedly to the sick area in lines or configurations. When the scarification was completed, the doctor rolled a baton over the scratches to stop the bleeding. To treat stomach ailments, the stomach region was lightly scarified or scratched; for a sprained limb the appropriate muscle was scarified.¹¹ To this day many

Tunisians, in the case of an injury, lightly scratch the affected area with a razor, releasing a bit of blood, and claim to feel much better afterward.

Cautery was a means of treating superficial wounds and skin ailments. Rings of hot iron, for example, were lightly placed around bullet wounds. Sometimes infected sores such as plague buboes were cauterized with branding irons. Many famous hadiths and proverbs reinforced these remedies: ‘fire draws out the poison of the nerves’; ‘the best medicine is cautery’. Infections were thought to be caused by bodily impurities that could be treated mechanically.¹²

Phlebotomy, or bleeding, was an important component of Galenic–Islamic and prophetic medicine. In medieval times, it was developed into a complex art of surgery of the veins widely practiced in North Africa. Bleeding was most commonly done from small blood vessels in the nostril or earlobe but also at the location of injury or pain. Many cultures have suspected excess blood to be a cause or symptom of disease.¹³

Whereas Galenic–Islamic medicine generally attributed disease solely to natural causes, prophetic medicine ascribed disease to divine power and the actions of evil spirits (usually referred to as *jinn*) as well as to natural causes such as cold wind. Jinn were considered susceptible to a variety of substances, amulets, and the interference of persons possessing *baraka* (mystic power). Baraka was thought to be inherited by certain descendants of the Prophet, or possessed by marabouts (Arabic, *murabitun* [in North Africa, holy men or women, saints]). Jinn were believed capable of covering great distances in an instant and, though usually invisible, they were able to assume human or animal form, to live in marshy places, and to frequent people’s homes. Gases and bad odors were manifestations of jinn; when walking near foul miasmas or latrines one asked protection from them. They were thought to be especially active during the cool evening hours. Unpredictable, they became vengeful or violent if offended by those who shared their world. Retaliation often came in the form of an illness; if one stepped on a jinn and failed to mitigate the offense by one of the available means, the result might be a mild illness or an injury. For more serious offenses, jinn might take over the whole body and produce symptoms of mental illness, epilepsy, madness, or depression. Armies of jinn attacking in swarms could cause epidemic disease.¹⁴

Substances believed to cancel the evil effects of jinn included sunlight, salt, silver, gunpowder, henna, kohl, and the fumes of strong substances such as tar and pungent herbs. Since it was believed that epidemic diseases were caused by armies of jinn, one logical means of individual protection was an amulet (*hajib*) prepared by a marabout and ‘purchased’ for a donation of a few cents or a small gift. Amulets came in many forms.

Among the more common were papers that contained sacred words or numbers. When attaching the amulet to his or her clothing, the patient was to recite a formula such as 'God the all-powerful, the creator, the master of bodies and souls, cure me.' Sometimes the papers were placed in a cup of water to dissolve the ink and the potion was drunk.¹⁵

Prophetic medical procedures for dealing with the spirits were further developed by men and women of the Sufi orders. Exorcizing the jinn was a formal ritual with prescribed methods which varied from order to order. Sufi hospices functioned like hospitals in the sense that those seeking cure might stay in them until the healing power of the marabout took effect. Still performed in North Africa, the ceremonies resemble modern group therapy sessions in that the sufferer is supported by a community of well-wishers who direct their efforts toward his or her recovery. If cured, a patient might acquire a new identity as a follower of the saint and a member of the Sufi order.¹⁶

One of the largest Sufi orders in Tunisia was the 'Isawa order, which specialized in healing ceremonies. The order was founded in about 1500 in southern Morocco and spread eastward. The founder of the order, Muhammad b. 'Isa, was famous for his cures – laying on of hands and spraying saliva – and was thought to be immune to disease and to have passed this immunity to his followers, who were called in to perform the healing ceremonies in time of epidemic. The 'Isawa were thought to draw the jinn away from the susceptible lay persons to themselves. To heal a sick person, the 'Isawa recited specific formulas, massaged or placed snakes (friendly creatures) near the patient, or, like the founder, passed their hands over the sick person while reciting the name of God, the Prophet, and 'Isa. In ceremonies designed to cure a patient possessed by jinn, the 'Isawa joined hands in a circle and danced to flute and drum music, jerking forward and backward and repeating the *shahada* (profession of faith). When worked into a frenzy, they devoured scorpions and broken glass, walked on coals, swallowed swords, and attacked things colored black or persons wearing black, horror of black being a characteristic of the order.¹⁷

Similar healing practices exist in many parts of the world. The 'mediators with spirits', when in a state of possession, salivate, roll their eyes, become indifferent to pain, and can perform feats impossible in a normal state. Generally, rhythmic chanting, motion, music, and sometimes hallucinogenic drugs help to produce this state. The cures have been witnessed many times; modern advocates of the art of exorcism attribute their effectiveness to magnetic forces of unknown nature, and above all the confidence, will, and conviction of the patient.¹⁸

In Tunisia, the elite tended to consider such practices excessive, magical,

and un-Islamic. Individuals of all classes, however, sought cures from secular and religious healers trained in the art of medicine. For serious diseases or injuries, selection of medical system was often a question of ability to pay, with an occasional but not universal preference for European medicine.

European medical theories in 1800 were also derived from Galenic-Islamic sources, but during the Enlightenment and the Scientific Revolution, as a result of new methods of experimental research, new chemicals had been added to European pharmacology, anatomical knowledge had been advanced, and certain diseases had been differentiated and classified. Medical instruments were more numerous and more complex and there was great enthusiasm for medical and biological research. Effective means of prevention and treatment of most diseases, however, were to remain uncertain for many years. In 1800 Europeans suspected three general causes of epidemic disease: miasma, contagion, and astral influence (all of which originated in antiquity). Miasmas were corruptions of the air, usually believed to be caused by putrefying matter or decomposing bodies. Contagion was thought to be a kind of material from an infected person that could cause disease. It was vaguely referred to as 'fomites', coated with a substance rather like glue that could attach to the victim. Astral influences referred to planetary actions that were thought to influence the course of events and accordingly the spread of disease. Many believed in all three causes or in a combination of them and thought divine power ultimately responsible for their actual operation. But by the beginning of the nineteenth century theories of astrological or divine causation were nearly dropped by the medical profession. In time of epidemic, however, ordinary people demonstrated their belief in contagion by terrorized flight from the diseased.

Following the Marseilles plague epidemic of 1720-1, doctors debated whether plague and certain other infectious diseases were in fact contagious. M. Chirac, personal physician of the Regent of France, went to Marseilles with a commission to investigate the nature of the disease. The commission disagreed but the majority opted for the contagionist line. Chirac, head of the commission, himself was an anticontagionist; in his published writings he accounted for the immunity of a girls' convent located in the center of Marseilles during the 1720 plague by their faith in God. In 1724, as will be shown in Chapter 1, he sent Peyssonnel, one of the Marseilles doctors, to Tunis to learn whether the Muslims thought plague contagious and how they treated it.

In 1721, on the basis of information about the Marseilles epidemic, an English physician, Richard Mead, published his influential *Short Discourse Concerning Pestilential Contagion* in which he argued that

plague was imported in goods such as cotton, by diseased persons, or by air. The air could be modified by atmospheric changes, a concept derived from miasmatic theories. To Mead, plague was a poison that originated in Asia or Africa and quarantines then in use should be reinforced.¹⁹

Yet it was observed that individuals, families, or whole quarters were inexplicably spared the effects of a given epidemic, and even the most strictly enforced quarantine rarely succeeded in containing disease spread. Doctors who treated plague victims often did not contract the disease. Furthermore, plague occurred seasonally, disappearing in winter. A succession of anticontagionists argued that plague was an exhalation (*miasma*) that originated in the ground, was extracted by the heat of the sun, and was carried by winds. Though miasmas were thought to come from Asia or Africa, quarantines against them were quite useless.

The controversy between miasmists and contagionists was of critical significance because quarantines disrupted orderly trade and commerce, causing economic losses that seemed at times more severe than the disease itself. In the early nineteenth century the debates between contagionists and miasmists were to become more heated. Clot Bey, Muhammad 'Ali's director of health in Egypt and a leading anti-contagionist, speculated that plague was caused by 'electro-magnetic disturbances operating quite independently of local insanitation or infection'.²⁰ Some thought plague and typhus were different symptomatic manifestations of one communicable disease that could transform itself according to changes in climate or other natural conditions. The debates on miasmatic or contagionist causation excluded such clearly contagious diseases as smallpox and focused on other major scourges of the nineteenth century: plague, typhoid, typhus, yellow fever, and cholera. In 1700 few doctors had totally abandoned the humoral theory of disease. But by 1800 the practice of systematic recording of observations, drawing of inferences from recorded data, and testing of inferences with controls led researchers to question ancient medical concepts of causation. However, lacking the germ theory of disease, treatments developed in antiquity remained in use. Bleeding, purges, and blisters to draw out 'morbid matter' were standard remedies. Herbal and chemical medicines were sold by apothecaries without consultation with a licensed physician. Apothecaries far outnumbered doctors in European cities in 1800, and most persons consulted a doctor as a last resort. Perhaps because of the severity of standard treatments, homeopathic procedures (like cures like) were popular. Homeopathic remedies such as small doses of cinchona (quinine) or belladonna were far less toxic than many treatments in common use.²¹

The germ theory was not substantially developed until the second half

of the nineteenth century, when the compound microscope was improved, the theory of spontaneous generation of microbes disproved, and techniques for isolation of microbes in laboratory cultures developed. The contagionists were ultimately vindicated, but in fact the miasmatic theories which led to sanitation programs to remove noxious substances probably reduced disease mortality more effectively than the quarantines of the early nineteenth century.

Thus European and Muslim medicine embodied similar ideas concerning epidemics derived from empirical observation, the common Judaeo-Christian-Islamic heritage, and from Galenic (Greek) medicine. By 1800 the two systems of thought had only begun to diverge. During the nineteenth century, medicine was to advance rapidly in European and in Muslim regions. In Tunisia, the mechanism of this advance must be studied not only in the context of the Industrial and Scientific Revolutions, but in the context of the colonial encounter that revolved around new commercial and political power struggles.