

# Dominique-Jean Larrey, Chief Surgeon of the French Army with Napoleon in Egypt: Notes and Observations on Larrey's Medical Memoirs Based on the Egyptian Campaign

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**Abstract.** Dr. Dominique-Jean Larrey wrote memoirs of 12 diseases he encountered while serving as chief surgeon of the French army during Napoleon's Egyptian campaign. He describes symptoms and treatments, evaluates remedies used by the Egyptians, and the effects of the climate. Of interest are his original though misguided explanations of causes of sickness or complications from wounds as well as descriptions of medications—now known to be dangerous—but all balanced by his common sense and efforts to ameliorate suffering.

**Keywords.** Napoleonic Wars, French Army, Egypt, Larrey

**Résumé.** Dominique-Jean Larrey a rédigé 12 mémoires sur des maladies qu'il a rencontrées comme chirurgien en chef de l'armée française durant la campagne égyptienne de Napoléon. Il en explique les symptômes et les traitements, évalue les remèdes utilisés par les Égyptiens, de même que les effets du climat. D'un intérêt particulier sont ses explications, certes erronées, des causes ou des suites des maladies provenant de blessures, ainsi que ses descriptions de médicaments – aujourd'hui reconnues dangereuses – descriptions toujours éclairées par son discernement et par ses efforts pour endiguer la souffrance.

**Mots-clés.** guerres napoléoniennes, armée française, Egypt, Larrey

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THE INVASION<sup>1</sup>

When Napoleon and his army invaded Egypt in 1798, he announced that he intended to free the natives—the fellahin—from oppression by the Ottoman Turks and their unmanageable servants, the independent renegade warriors, the Mamlouks. To that end the effort failed, as did Napoleon's unfortunate attempt to vanquish Turks in Syria. In fact, far from protecting the villagers from exploitation, Napoleon's men soon were taking horses, foodstuff, and taxes.

The Egyptian adventure was redeemed from total disaster by the great publication *Description de l'Égypte*, written and illustrated by more than 164 scholarly and talented engineers, mathematicians, astronomers, map makers, artists, and many more, who had been summoned to join the expedition on orders from Napoleon. They gathered somewhat secretly and sailed on 19 May 1798 with the large fleet of French ships, first to Malta and on to Egypt. Napoleon led some 34,000 troops ashore near Alexandria, occupied that little half-ruined town, and ultimately arrived in Cairo. He had ordered his flagship and escorts to depart, but they stayed on, probably expecting the Army to need at least some of them. But within a month Admiral Nelson and his English fleet found these French ships anchored near Alexandria. In a bold maneuver Nelson took his ships between the shore and the line of French vessels with their cannons aimed out to sea, and blew them up, set some on fire, and chased away the rest. Thus Napoleon and the French army were marooned in very unfamiliar territory, in a hostile climate, but in the most intriguing country of the world—worthy, as Napoleon had anticipated, of study.

Three years later, after it was all over and the English-Turkish coalition had sent the French home from Egypt, the *savants*—the distinguished men of arts and sciences—back again in Paris, set to work to produce the monumental *Description*. Their drawings of the ruined temples from the time of the pharaohs, scenes depicting life in Cairo, studies of the plants, birds and animals of the Nile Valley, and splendid maps, were so many and so massive that special presses had to be built to print the larger illustrations of their work. The texts contain detailed reports of the lives of Egyptians, and we examine through Dr. Larrey's chronicles some of the diseases with which the French had to contend while occupying Egypt. The huge *Description de l'Égypte*, whose title page<sup>2</sup> for the relevant volume is given below, began among the French a fascination with Egypt that spread throughout the world.

DESCRIPTION DE L'ÉGYPTE / OU RECUEIL DES OBSERVATIONS  
ET DES RECHERCHES / QUI ONT ÉTÉ FAITES / PENDANT L'EXPÉDI-  
TION DE L'ARMÉE FRANÇAISE / PUBLIÉ PAR LES ORDRES DE SA  
MAJESTÉ L'EMPEREUR / NAPOLEON LE GRAND / ÉTAT MODERNE /  
TOME PREMIER / A PARIS / DE L'IMPRIMERIE IMPÉRIALE / M.DCCC.IX

## THE GOOD DOCTOR

Baron Dominique-Jean Larrey (1766-1842), remembered today for introducing the "flying ambulance" used in warfare and for his skillful life-saving amputations, had daily contact with the most dreaded results of combat and sicknesses for which causes could only be guessed. His overall judgment was that large numbers of men from a different climate should not be suddenly exposed to brutally hot days and chilly nights such as those in Egypt.

Napoleon described Dr. Dominique-Jean Larrey, chief surgeon of the French Army, as "l'homme le plus vertueux que j'ai rencontré, le véritable homme de bien." Dr Larrey was a skilled physician honored even by the English, and a kindly man who attended to all patients with compassion. The Duke of Wellington at Waterloo—so the story goes—happened to see Dr. Larrey (by then Baron Dominique-Jean Larrey) ministering to a wounded soldier in a dangerous, exposed place on the battlefield. The Duke commended the physician saying that there was a man "of an age no longer ours."<sup>3</sup> He would treat enemy wounded when asked, and tried to ameliorate the diseases endemic among the natives. His *Memoires et Observations sur Plusieurs Maladies*<sup>4</sup> consist of descriptions of these diseases, many already known in Europe. He recorded his observations of early symptoms and possible causes of both common and exotic health problems, development of the full-blown sickness, life-threatening infections, and his methods to combat or alleviate suffering and ultimately to save lives. Although his concern was primarily for French soldiers, Egyptians suffered from the same diseases, their soldiers and the Ottoman Mamlouks suffered the same wounds in battle, and Larrey tried to devise treatment for all. Sadly, as we shall see, the medicines Dr. Larrey could depend upon were few and far from adequate, and his concept of the sources or causes of illnesses mostly off the mark.

## TRADITIONAL MEDICINE IN EGYPT

Larrey was not alone in his interest in medical issues during the occupation. General Antoine-François Andréossy, a close friend of Napoleon and member of the Cairo Institute, discovered through his own research that for a seriously ill Egyptian, "magic" words written in a note by a *der-vice* and placed under the sick man's head, were believed to cure.<sup>5</sup> M. Rouyer, a colleague, pharmacist, and member of the Commission of Sciences and Arts of Egypt, made inquiries into the medicines used by the natives. Rouyer's more important research, possibly of use to Larrey, was the comprehensive list of 78 preparations used in Egypt, almost all derived from plants. The raw materials came from India, Europe, Central America, China, the Indies, and Arabia, among others. Many conco-

tions from these imported ingredients were for cosmetics used by women and to make the female figure more alluring by added weight.

Rouyer (probably with tongue in cheek) concluded that the three causes of illness recognized by native Egyptians were overabundance of bile, sudden cold weather, and great heat. For these three ailments there were three cures: laxatives, warm food and drink, and cool refreshing food and drink. He notes that the natives also used opiates, spices, and coffee to help them heal. Toothache was virtually unknown; teeth were white and beautiful. He attributed this advantage to brushing and frequent rinsing of the mouth, one of the ablutions before prayer. Among Rouyer's discoveries was the mysterious nostrum *thériaque*, used not for illness but rather as alcohol was used in Europe. It was an opiate and caused mild inebriation. Sheiks in league with opiate merchants were supposed to make it in secret out of the flesh of vipers; it was also used as an antidote to snake bite. Copts and Jews sold it in boutiques and charlatans touted it on the street. Profits from sales of *thériaque* helped support the city asylum for the elderly, mad people, and the indigent sick.<sup>6</sup>

#### OPHTHALMIA

The first distress the Europeans experienced, adding to hunger and thirst on the march from Alexandria to Cairo in heavy uniforms in a desert in July, was inflammation of the eyes. Such ophthalmia or conjunctivitis, with burning and swelling and a sensation like grains of sand or even abscess under an eyelid, if untreated, could lead to blindness or death. Almost non-existent shade and brilliant sun and dust kicked up by marching feet combined to torture unaccustomed eyes. As for "accustomed" eyes, almost one-fifth of Egyptians had lost one eye, and many were blind from trachoma, a chronic, contagious form of conjunctivitis.

Ophthalmia reached full development after three or four days. Treatment included foot baths, inhaling palliative steam from boiling seeds and herbs, application of pomade of red oxide of mercury, made of camphor dissolved in yolk of egg, use of a lotion made of flaxseed or another made of poppy heads and saffron, and an ointment made of egg white, rose water, grains of sulfite of aluminum and camphor, the latter to be applied at night to calm the pain.

When swelling around the eyes demanded further care, leeches were placed as close to the eye as possible. These annelids would fill with blood and reduce the pressure. If leeches were unavailable or disinclined to fasten near the eye, scarification could attract them to blood, or served as a form of bloodletting. To the surprise of the medical staff, it appeared that gonorrhoea cured conjunctivitis.

To prevent ophthalmia, Larrey concluded, shield the eyes from the sun, avoid dust, stay away from marshy places, cover up in the chilly

nights, encourage sweating, be careful in the use of alcohol, abstain from heat-producing foods, and bathe the eyes with cool water with a bit of vinegar added. Typically Larrey advised against subjecting men to an extreme and contrasting climate.<sup>7</sup>

#### TETANUS

Dr. Larrey observed and wrote about this prevalent and terrible condition from onset to ultimate rigidity so extreme that a man's body could be lifted by one leg. After a battle in 1798, 10 wounded men spent a night in a humid area and tetanus set in. All died about the same time some days later. Today it is known that tetanus spores are found in soil, in feces of many domesticated animals, and on human skin. A battlefield was ideal breeding ground.

At the time of the French invasion death from tetanus was common but not inevitable. Mourad Bey, one of two leaders of the Mamlouks, sent a wounded man to a French surgeon in a Syout hospital. The doctor cleaned the wound and removed small pieces of bone, but evidence of tetanus attack on his central nervous system had already appeared—one arm was contracted, the jaw was locked, and the patient had difficulty swallowing. But after two warm baths he was made comfortable by a dose of six grains of opium and four of camphor. He seemed calmer and soon his organs resumed their function, the wound began to heal, and through "assiduous care" he was cured. He had been sent to the French hospital on 18 May and returned to service of the Bey on 29 June.

Dr. Larrey describes in detail healing a general wounded in the leg at the battle at Abouqyr. He had been treated for five days under a tent, then painfully carted off to Alexandria, where he had Dr. Larrey summoned. The suffering officer already had evidence of lockjaw with shooting pains in the wounded leg, etc. He was bled from the arm. Remedy emulsions to which were added nitrate of purified potassium, *ether sulfurique alcoolisé* and syrup made from white poppies and orange blossom water were fed to him with difficulty—he could barely swallow through his locked jaw. Slowly the wounds discharged pus again and the man could relax. Not long later this recuperating officer returned to France with Bonaparte.

Larrey concluded that extract of opium combined with camphor, and nitrate of potassium dissolved in a small quantity of liquid made with certain seeds and sweet almonds, was a drink the patients liked and could swallow, reinforcing the benefits of being bled. "Frictions" (massage) using mercury caused liver trouble and even madness. Often life could be saved only by amputation of the affected limb.<sup>8</sup>

## PLAGUE

On the march north to Syria in 1799, where Napoleon intended to vanquish the Turks and their English allies, a few of the French contracted bubonic plague. But not until they reached Jaffa and other port cities where ships unloaded their unsuspected cargo of rats (ships=rats=fleas=plague) did it become a real danger. There contagion from the *peste* increased among the troops so that from 6 to 15 men died per day.

Then came a short lull in the terrible infection until the army reached Saint Jean d'Acre, a principal port, where they settled into camp. English ships reinforced and supplied the Turks while Napoleon stubbornly tried to take Saint Jean d'Acre, attacking the one well-defended side where the peninsula joined the mainland. The French remained two and a half months only to give up their attempt to reduce the city and stumble back to Egypt. French soldiers numbered 13,000 when the campaign began. Twelve hundred died in combat, 1,000 more died of plague, and many of the 2,300 sick and wounded were left to die by the sabers of the Turks or to commit suicide. The march south along the coast to Cairo was under a cloud of smoke from burning villages and crops.

Many men were lost in the fruitless effort to defeat the Turkish army reinforced by English ships. In Cairo Napoleon claimed victory, though it was widely known that his dream of becoming a second Alexander the Great had become a nightmare. Within two months he secretly slipped out of Egypt, avoided English ships and arrived safely in Europe. He left General Kléber to command the doomed army remaining in Cairo.<sup>9</sup>

While at Saint Jean d'Acre, however, plague set in. Soon doctors were summoned to examine soldiers who felt uncomfortable, couldn't stay still, stopped eating, complained of headaches and pain in the joints, and sank from anxiety into general weakness. Some had occasional chills and could not breathe; their scars hurt and stomachs were upset. Their eyes were teary and without expression. The pulse was weak but some hours later it accelerated and fever began; the skin was burning hot. Headache increased, eyesight was troubled, and the voice weak. Then with increasing fever delirium set in. Some men ran out into the fields, others into the sea, and after violent exercise returned to their shelters and perished. Some victims died in the first six hours.

In other cases—there are varieties—buboes or inflamed swellings began to appear, boil-like lesions in the groin, armpits, then elsewhere. If they started early in the illness and began to discharge, cure was possible. Red spots appeared, became brown and finally black. Sometimes the buboes spread together and were called *charbons* for their black color: the origin of the term Black Death.<sup>10</sup>

## LEECHES

Desperately thirsty French soldiers occasionally would drink from pools or from a marshy spot left by the receding Nile flood if it presented itself. In this way they swallowed leeches, which fastened themselves in the back of the throat. These leeches generally were about the size of a horse hair until they began to pull blood from the host. The poor victim, feeling the creature in his throat, would cough, spit, and see blood. In time swallowing became difficult, breathing laborious, the lungs sore from coughing, and the entire chest painful. He lost weight, could not sleep; there were stories of some deaths because of this awful parasite.

For one such sufferer the leech attached itself in the nasal passage. Egyptians knew of horses that drank from weedy pools and guessed the source of the soldier's complaints. An Egyptian blacksmith who dealt with the health of horses had devised a sort of pliers with which he extracted leeches. When the creature was too far inside to use the pliers, salt water flushed it out. But the blacksmith had never heard of a human victim until one unlucky officer, chief of a brigade, drank from a lake and was tormented for the rest of the campaign. After suffering, spitting blood and growing thin from loss of blood, someone recognized the cause and pulled or flushed out the culprit. Dr. Larrey himself used tweezers to pull out leeches, usually by the tail. From then on the men used filters or vinegar to make pond water potable.<sup>11</sup>

## HEPATITIS

Symptoms of the onset of hepatitis are fever, loss of weight, with the skin developing a yellow cast. Pain is felt on the right side below the ribs. A swelling on the convex side of the liver is sensitive to pressure. Sympathetic pain is sometimes felt in the shoulder. The liver is enlarged, and a tumour below the ribs contains bile that can spread into the chest cavity. The sick man's skin color reflects the amount of pus contained.

Dr. Larrey deemed treatment from the exterior dangerous, with caustics or cauterizing leading to further complications. His conclusion was that the only effective procedure was to open the abscess with a sharp instrument, then place the patient in a position from which the bile could flow out. After the operation the wound was bandaged with several layers of cloth and shredded linen, changed often. Compresses of honeyed wine were used to complete the treatment.

Dr. Larrey commented that it is important to know the different causes of hepatitis in Egypt; which he describes as follows:

Burning heat attacks fat people, transforming fat into liquid that produces a uniform compression in cells of the adipose tissue and skin. This fat seeks to escape by way of least resistance, enters the blood stream and reacts in the

liver with irritation and engorgement resulting. Wine and liqueurs are a serious threat to health in Egypt. The Koran does well to forbid their use. Alcoholic drinks combined with heat of the climate produce hepatitis by acting on the digestive organs. Diarrhea, when suddenly stopped, causes hepatitis.

Drinking slightly salty water can cause hepatitis. Two brigades stationed at Suez and Qatye had a great number of cases. The water affected the bile-producing organs and disposed them to engorgement. A change from sweating to chill, excessive fatigue on campaigns in the Libyan desert and on the frontiers of Asia, and too many rub-downs with mercury preparations when combating venereal disease, cause hepatitis. Unnecessary bloodletting and strong purges or emetics are causes. A man's mild temperament helps make him immune to this sickness. During the *khamсын* (50 days of erratic weather) patients die from rapid development of the illness.

Citing several successful operations on men and one case of spontaneous cure, Larrey concluded that the liver is the true source of hepatitis. To prevent hepatitis, he advised against too much "commerce with women," alcoholic beverages, excessive exposure to sun, and too much cold and humidity. Nights in the desert are surprisingly cold and heavy dew can soak a tent top so that it will appear to smoke in the morning sun.<sup>12</sup>

#### ATROPHY OF THE TESTICLES

Several soldiers, after the campaigns of 1799, complained of the almost complete disappearance of their testicles, though they did not have a venereal disease. Larrey had never seen this particular problem before. The symptoms he observed progressed as follows: a testicle (usually only one) lost feeling, grew soft, gradually became smaller and appeared to dry up to the size of a white bean. The spermatic tube also shrank and was atrophied. The men lost any desire to have intercourse, their legs shrivelled a bit and caused them to stagger, faces were discoloured and beards thinned, their digestion was altered, and their intellectual faculties deranged. Several of the victims were dismissed from service.

Larrey concluded the principal cause was the climate of Egypt. The heat caused the testicle to "melt," become flabby and disposed to decompose. The fluid in the testicles was redirected, so to speak, into perspiration, into the lymphatic system and lost in circulation of the blood. Tissue of the vessels that would resist such effects weakened and dried up. The whole testicle lost its volume and shrivelled.

Larrey further attributed the atrophy to several circumstances: the hard life of the soldier and too much drinking of date brandy (to which the natives added juices of poisonous fruits to enhance the effect on the nervous system), the hot climate, and the fact the stomach and testicles influence each other. He judged pernicious the use in hot climates of certain species of the nightshade family. These plants were used as a rem-



edy for fever and for ailments of the chest, the juice good for spots on the face. The juice of the poisonous plant—similar to the “poison parsley” used by the Athenians to execute felons—applied to the scrotum was known by the ancients to cause it to atrophy.

If the patient's testicles had just begun to show symptoms of atrophy, Dr. Larrey recommended flagellation of the buttocks with switches or dry massage, and soothing and healthful food, as well as the avoidance of spirits, especially date brandy. He suggested wearing a fairly tight supporter and bathing the body with lotion of water and vinegar. Lastly, avoid too much commerce with women.<sup>13</sup>

#### SARCOCÈLE

The sarcocèle begins with a fleshy mass that grows on the scrotum and develops a crusty, scaly scab. It is hard in some places, soft in others; there is no pain if it is pressed. It is not a problem except for its weight and interference with walking, which makes necessary a sling to hold the tumour. Urine seems not to cause trouble. The external membranes of the testicles thicken and grow and the skin stretches over the thickness. The testicle keeps its shape while the tumour expands, but soon it can only be seen from the back. The end of the penis somewhat resembles the navel near the front or middle of the tumour and urine escapes through that opening.

Workers who sit all day, such as weavers, tailors, and embroiderers, are most susceptible. Other factors contribute to this malady, for instance syphilis with its characteristic sores on the coverings of the testicles. To these causes Larrey added poor diet, intemperance, the abuse of women or living near moist, marshy places. Women almost never suffered these growths seen frequently in men, possibly because of the regular flushing of the uterus.

Larrey saw, while in Egypt, 10 or 12 sufferers with tumours weighing close to 100 pounds. When the growth is removed by surgery the patient feels little pain. One man of 60-plus years had the tumour from his twenties. By the time Larrey saw him he was bedridden; he had already consulted several doctors in Egypt. They had tried remedies using fire, strong caustics, and a large needle. The last physician had pushed through the tumour from one side to the other a long needle with cord attached and had caused no damage to the testicle, demonstrating that the tumour did not interfere with the testicle itself. The cord was pulled through every day and caused the tumour to discharge a smelly fluid. The patient also suffered from elephantiasis. The prolonged use of the cord resulted in a small reduction in the size of the tumour but had hardly any more effect than previous attempts. Dr. Larrey proposed amputation and the patient wished it. But at this point Larrey was

ordered to Alexandria where the English threatened a landing; this prevented the operation on the suffering man. When the condition begins it may be treated, but when advanced, amputation is necessary, with use of medications to destroy the causes. Among the latter is an antimonial preparation combined with a mercury element producing sweating, given in appropriate doses and continued a long time, alternating with mineral acids given in small quantities in mucilaginous drinks. These produced a good effect when used with a lotion in which diluted sulfuric acid and several other elements were combined for an astringent external benefit.<sup>14</sup>

All writers agree that this disease is incurable by treatment both internal and external. Doctors held back from amputation for reasons of fear or hesitancy. M. Imbert Delonnes ignored opinions against the operation, and performed it on Charles Delacroix, father of the painter, in Paris. "Je n'avais pas encore connaissance du succès de son operation"; Larrey intended (when he was not needed by the army) to perform similar operations on voluminous sarcochèles.

#### YELLOW FEVER

So many deaths resulted from otherwise minor wounds of the French soldiers in the Battle of Heliopolis and the siege of Cairo (1800) that the men began to say the enemy bullets were poisoned. The onset and fast development of the sickness made it easy to believe but, said Dr. Larrey, it was easier to banish that idea than to cure the sickness that followed the wounding. It seemed to him the trouble resembled yellow fever known in America (in 1793 thousands died in Philadelphia) and analogous to a similar ailment among French soldiers in Santo Domingo. This new problem all started in Egypt on 5 April 1800. Only certain men seemed prone to it—those wounded in the joints or with fractured bones; men with wounds of the face or the extremities did not contract the ailment, or so it seemed.

First the victim shivered, feeling cold, then fever set in, the eyes were sad with a yellowish caste, the face like copper, the pulse slow and irregular. The wounds seemed dry. Presently the sick man became very thirsty with great pains in the stomach and head; some became delirious. A hemorrhage from the nose and vomiting sometimes produced a favourable crisis, but more often the symptoms increased, the skin became more yellow, the patient could not remain still or sleep. All symptoms of the malady was seen in the first 12 hours, and the victim died on the first, second, or third day. For those who could be saved the doctors used light emetics, wine cut with lemonade to calm the stomach, camphor combined with opium in proper doses. In some cases treatment by "cupping" to draw out the pain or elements of the sickness,

was considered useful. A small vessel like a cup would be heated over a flame, then placed on the skin. Cooling air inside the cup pulled on the skin. Tonics and mustard mixed with vinegar applied to the torso or back seemed to calm pain.

Two hundred and sixty persons died after the Battle of Heliopolis, and about 600 died in the siege of Cairo and in taking Boulaq. Not all the wounded who showed symptoms of the yellow fever died; if they lived two weeks they could recover. If a wounded but otherwise healthy man was placed in the bed of one who had died of the fever and he became ill with yellow fever, one could conclude that the fever was contagious. But this was not always the case. The medical men tried to blame other causes: the victim's overall constitution, crowded conditions in the hospital, or a bed placed on the ground floor where humidity favoured contamination.

Dr. Larrey deplored encampments in wet places filled with putrid emanations; mosquitoes escaped his notice. He theorized that the contrast between hot days and cool nights causes many ailments. The *kham-syn* period in spring—strange winds, dust storms, a little rain—is still regarded as an unpleasant time and worried Dr. Larrey particularly. He also suspected the excessive fatigue of the soldier, scarcity of good food, lack of acid drinks, and need of blankets at night.

Finally the siege of Cairo ended, and the army was able to set up new hospitals and improve food and medications and supply better linen and more comfortable bedding. But the one event that put an end to the yellow fever was the return of the north winds, according to Dr. Larrey. All victims, if they survived, had long and painful recoveries.

Turkish soldiers also suffered from yellow fever. Larrey was asked to minister to them, after the French occupied Cairo again. He gathered them all together in a mosque where he could treat them more easily. Some died; Larrey observed they had become weakened by privations during the siege and poor treatment.<sup>15</sup>

#### LEPROSY

There are symptoms common to leprosy and elephantiasis, but leprosy attacks only the body's exterior. Leprosy begins with vague pains in the legs. Little bluish pimples that contain pus appear and spread together to form plaques. These attack the face and extremities, rarely the chest or stomach. Buttocks and knees are not affected. Plaques ooze a yellow smelly pus. The breath is fetid and the pulse is weak; urine is abundant and breathing laboured. The lips thicken, the skin is rough and numb at the eruptions. The nostrils dilate, the nose sags and leprous spots spread but do not itch. The victim can remain years in this condition, or he may die soon.

Regions of skin affected lose feeling and strips of skin can be cut without pain. Fever begins and the patient sinks into a coma and is insensible. When ulcers attack ligaments, motion is painful. The face becomes hideous. Great malaise begins if the person is still conscious.

Is leprosy contagious? Dr. Larrey describes one case of a young man who had never had a venereal disease, lived a healthful life, but who had contracted leprosy. The man recalled that he had slept on a mattress taken from a house near Cairo. He had seen a dying woman covered with black crusts in that house; she probably had slept on the same mattress. The young man blamed this episode for his leprosy.

Many early Jewish and Arab doctors, and physicians of Cairo at the time of the French occupation, believed leprosy was contagious. Larrey also blamed a diet of salty meat, fish, and onions which Egyptians ate in great quantity. Pork and boar meat even though not salted was suspect. Swine were fed differently from those in Europe and their meat was exposed to the heat in Egypt and decomposed quickly. Larrey believed it was for this reason that both Jews and Moslems forbade pork in the diet. The doctor also thought contagion spread in crowded conditions where natives slept almost nude on the ground.

Leprosy demanded long treatment. Just as venereal diseases could be healed by use of mercury, bitters, quinine, opium-camphor and other tonics, these were also used for leprosy. Through all the stages warm baths to soften the pustules helped, followed by application of a salve. He advised to lift off the scabs with scissors or a surgical knife, cauterize remaining ulcers, then repeat until normal conditions return and the patient regains his functions. Daily treatment with dissolved oxide of copper, aluminium oxide, and a little sulfuric acid is recommended. Use vinegar to clean the bed and the apartment of the leper.

A *guide à pied* in the Army of the Orient was attacked by leprosy during the siege of Cairo late in 1801. Treatments did not help, he was thin and weak, and when his division left Cairo he went too. The sick man was released in Malta. There health officials believed he was a plague victim as his skin eruptions resembled effects of the *peste*. He was in quarantine in Malta, later was transferred to a lazaretto in Marseilles. Again his ailment was not considered pestilential and he was sent to Paris at the end of March 1802.

This victim had all the symptoms of leprosy—darkened skin, heavy eyelids, dilated nostrils, thick bluish lips, laboured breathing, no appetite and a weak pulse. Treatment was by beneficial tisanes and a bitter wine of quinine, and at night, a *bol* of camphor and opium. For walks during the day he used crutches. After three months his pains were calmed, his strength returned, but his skin remained much the same. Larrey undertook to cut away the dead skin, causing the patient no pain, only a little bleeding. Open wounds were cauterized and lotions of hot wine

used. After a second cauterization the flesh became red and sensitive: there was feeling in the skin. Little by little scar tissue formed and by 4 July 1802 the patient left the hospital. His face returned to normal but scars remained; he felt some pain when there were changes in temperature. The man, then of the *Chasseurs de la Garde*, retired with a pension and went home.

#### ELEPHANTIASIS

This disease bears some resemblance to leprosy, at least in its early stages.<sup>16</sup> A lymphatic malady, it attacks the skin and cellular tissue of the lower extremities making them grossly enlarged, hence the reference to elephants. As with leprosy, the sufferer begins with a general lassitude, weakness in the lower extremities and difficulty in moving those parts. The soles of the feet become sensitive and he feels pain along the bones. He is ill at ease, his face is discoloured, small grain-like pimples appear, then ulcerate and crack. These ooze like the leper's eruptions. Skin of the legs is marked by great numbers of varicose veins.

These extremities lose feeling, gradually grow in size and become hard. A finger pushed into the flesh makes no mark, leaves no impression. Skin of the feet and legs thickens. Fingernails become yellow and like scales. Contraction of limbs is difficult, the feet and legs become formless masses, heavy and almost paralysed. At this time the sufferer takes to his bed. His body thins, his face darkens, and his breath is fetid like the leper's. The face, except for the lips, does not change much and the eyes are lively and brilliant. Skin on the back is white, does not scale or change, while the beard thickens at the chin. The pulse and appetite remain normal.

The disease is not contagious but can be hereditary. It develops at the time of virility or later. The natural functions are not affected and the person can live to a ripe old age. Although the disease persists a long time, it comes on by degrees. Workers who stand in water in the rice fields of Barbados develop tumours but of a different kind. At Damietta on the Delta there are many cases of elephantiasis, but it is almost never found in drier places. Leprosy, on the other hand, is found in the dry desert climate. No military men known to Larrey have had this disease. It may be less prevalent in hot countries; Larrey said he had seen it in some countries of Europe. He had cured a 38-year old man found with the ailment.

#### SCURVY

In June 1801 the French were bottled up in Alexandria and environs by the British and Turkish forces. Most of the French troops were camped

on the shore of Lake Mareotis, into which Lake Ma'dyeh had flooded. Ophthalmia was being treated in the army, but scurvy now began to affect soldiers. It took some work on Dr. Larrey's part to determine that this was not a contagious disease. There were similarities in its effects to those he had seen in North America. In 1788 he had served as ship's surgeon on the frigate *Vigilante* and had 80-plus cases of scurvy to attend. They had suffered in the mouth and lungs, but he "brought them all home [alive]."

For soldiers already weakened by conjunctivitis, this new condition required special adjustments in treatment. Victims of scurvy went from stage one to stage three, worsening steadily. They feel unwell, wish to sit or lie down, are melancholy, insensible to what is happening in the war with the English, sleep poorly with bad dreams. Scurvy attacks the gums making them painful, bleeding easily. Respiration is laborious, limbs hurt, the pulse is slow and irregular and the skin dry and rough. Urine is discoloured; constipation sets in. The groin is affected and make walking difficult. Wounds change their character, their discharge becomes bloody, and scars sometimes reopen. The second stage finds the symptoms intensified. Head pains worsen. The patient is almost unmoving in bed, body curved and legs bent, face and lips livid. The gums are ulcerated and the teeth are covered with black tartar. Legs swell between the Achilles tendon and the tibia, then the swelling spreads. Black spots appear along the tibia and on the face and shoulders. The pulse accelerates, fever comes on toward evening. In the third and last stage, the tongue is coated, gums ulcerated, tooth sockets loose, and the soft palate is affected. There is diarrhea, and the kidney malfunctions, forcing the use of a catheter.

Why scurvy at this time? When the lakes cut off the French encampment from the rest of Egypt the blockade was complete. Vegetables and fresh meat were denied. Bread was made from rice and wheat, but the rice was very salty. The troops ate the salty bread for two months, and salted fish bought from people of Alexandria at outrageous prices. The bread improved when the rice was rinsed to remove salt, but when bread was made using water from cisterns in Alexandria which were unclean, the healthful qualities were removed. What causes scurvy? Larrey lists several causes. Excessive humidity from the expanded lakes, which were contaminated with rotting vegetation and dead animals. The sewers and toilets produced pernicious gases made worse by the French army and the 25 or 30 hospitals in Alexandria. Finally, the salt air from the sea and the need to stay on the *qui vive* for the possible approach of the enemy also affected the health of the men.

Officers, whose diet was better, did not suffer scurvy. Because horses were useless in the situation of blockade, Larrey asked that horse meat

be given to the soldiers, especially meat from young Arabian horses. Some objected to using horse meat, but Larrey ate it, suffered no ill effects, and in time it was shown to help the scurvy sufferers. Additional aids to recovery were light use of emetics, laxatives; drinks of "tamarind-ade" sweetened with molasses, acidic drinks at night, and in the morning one to two cups of coffee, more later in the day if wine was not available. Many soldiers were able to return to service with their corps, but many relapsed, wounds broke open, and scurvy was worse the second time. Treatment for a relapse included acidic drinks with added camphor and opium *gommeux*; Larrey had found this useful in Paris treating men in the Hotel des Invalides. A dose of quinine added to sweetened brandy was a morning drink plus camphor, opium and coffee. The bladder was treated with applied medication made of hot and acrid substances with a dash of mustard with a possible further application of vinegar with camphor and powdered quinine, or balm, on bandages changed every three or four days. Of 3,500 scurvy victims who passed through the hospitals, 272 perished.

The scurvy lasted from the early days of July 1801 to 10 October 1801, when the French including some of the sick embarked for France. Seven hundred scurvy patients arrived in France all healed or on the way to being healed when placed in quarantine; six or seven died on the voyage. One hundred or more sick men remained in Alexandria, but they too embarked for France when their health improved; few died.<sup>17</sup>

#### SYPHILIS

Mange and gout and other ailments in France are unknown in Egypt, but the free communication between native women and French soldiers propagated syphilis and produced a great number of sick people in army hospitals. But it was hard to deprive men, who had adapted to this climate and were vigorous again, of the company of women. To control this disease Larrey suggested to the general in chief the establishment of a hospital for prostitutes infected with venereal diseases. Pregnant women of the same class, who could abort at will, he would encourage to keep the babies and have the hospital deliver them. General Belliard responded immediately by assigning a large house for this purpose. Women suspected of "commerce" with French soldiers could be examined and those free of disease released; those who were infected were kept in the hospital and given great care. Larrey selected a M. Casabianca to head this facility as adjutant chief surgeon. At the same time examinations of men in the barracks turned up those with diseases and sent them to the military hospital to hold until they were healed. These measures were successful and soon individuals of both sexes were returned to health.

The hospital provided by the philanthropy of General Belliard also accepted patients with serious infirmities in the hope of encouraging them to have faith in the art of healing. But the Europeans could not overcome Egyptians' prejudices, which drove them to abandon themselves to their habit of dragging out a miserable existence in the streets.<sup>18</sup>

Syphilis in Egypt rarely presented serious symptoms and was cured easily, but if the disease were to be transmitted to Europe it could become very difficult to cure. Larrey treated soldiers who brought the disease back from Egypt and found it difficult to rid the victim of the disease even over considerable time. In Egypt he had found that mercury preparations taken internally succeeded along with tonics and a medicine to increase perspiration. Steam baths aided this treatment. Rubdowns with mercury preparations were dangerous: not only did they not heal, they produced violent frenzies or convulsive spasms.

INFLUENCE OF THE CLIMATE OF EGYPT ON WOUNDS AND PARTICULAR REMARKS ON THE PHENOMENA THEY PRESENTED DURING THE EXPEDITION

In Syria wounds from firearms complicated by fractured bones, especially the humerus, although treated methodically and with care, almost always were followed by uneven articulation. The two fragments of broken bone remained mobile as rough stumps and protruding angles covered with a cartilaginous substance which enabled the movement in an imperfect manner but without pain. Larrey sent several patients with this infirmity back to France. He attributed this problem to (1) motion these wounded had to endure after leaving Syria to return to Egypt on foot or sometimes mounted; (2) the bad quality of the food and bad water they had to drink on that painful trip; (3) the atmosphere of Syria, almost void of vital air and loaded with pernicious gases coming from numerous swampy places the French had occupied. All of these causes impeded healing, whether by diminishing the deposit of calcium or by disturbing the contact of the bones so they could mend. Confining bandages, aromatic massages, rest, and diet made no difference. Perhaps a change of climate and use of mineral water would have helped the men suffering from these misaligned articulations.

Also on that campaign, very slight wounds to the shoulders, not involving bones, were followed by complete or incomplete paralysis of the limbs corresponding to the wound; this never happened in Europe provided the principal nerves were not cut or damaged. During the season the French were there, the climate of Syria, with its devastating qualities, may have determined the paralysis in the wounded limbs. Back in Egypt where the air was cleaner, Dr. Larrey treated the sufferers with *moxa*: use of a little cone stuffed with cotton and set afire—usually



for cauterizing a wound—and then application of *ammoniaque* to prevent inflammation of the wounds. Thermal waters in Europe healed several for whom the *moxa* had not been sufficient.

The *khamsyn* in Egypt caused complications, but when the wind from the north began, with breezes all day long, healing improved. The French doctors also used the *charpie* made from new cloth, well washed; from which little straight threads inserted into a wound helped it heal. Good hospitals, healthful location and excellent food aided. Amputations also benefited and the wounds healed in 30 days. Operations for kidney stones healed in 15 days. The trepanning operation on a great number of wounded had complete success. Other injuries to the chest, stomach and extremities, healed promptly.

Bullets of the Turks and Arabs had a small metal protrusion about an inch long which made them hard to extract and created more damage. This bit of metal tears soft tissue, breaks blood vessels, harms nerves and buries the bullet easily in the bone, especially in the joint. These wounds hemorrhage more frequently than wounds from French bullets. To stop the hemorrhaging and stop the pain, it was necessary to make deep incisions to find the blood vessels and make ligatures, cut nerves and the muscles attached to bone that were punctured, and to extract the bullet. A tweezer, slightly curved in its length with holes in the two blades with indentations to receive and hold the bullet, served well. Great precaution was necessary in the extraction to prevent harm in the soft tissue.<sup>19</sup>

#### THE "FLYING" AMBULANCE

Dominique Larrey designed a new kind of ambulance by which wounded were carried off the field of battle. In Europe in 1793 he had created, on the banks of the Rhine, a wheeled vehicle for this purpose. It was light and fast, hence "flying," compared to the huge old conveyances called *fourgons* drawn by 40 horses. After a battle the wounded were collected in these big, lumbering wagons to be taken three miles to the field hospital, usually through mud and bumpy, chaotic hazards of the roads. So Dr. Larrey's two-wheeled buggies (for flat country) or four-wheeled carriages (for hills) could rapidly escape the battle or battle-field carrying the wounded.

In Egypt the men in charge of collecting the wounded during and after a skirmish rode camels. Wheels do not move well in sandy desert terrain. To transport battle victims the doctor devised two baskets made of palm branches long enough to allow patients to lie down. These were secured by straps to the camel saddle. There were 24 camels for each division, not including camels carrying food, tents, and ambulance supplies, all commanded by the surgeon in chief of the army.<sup>20</sup>

## LARREY'S VIEWS OF EGYPTIAN MEDICAL PRACTICE

The Egyptian word for a doctor was *haykm*. In his memoir Larrey generously points to treatments in Egypt for external problems, remedies unknown or little used in Europe: for instance the *moxa*, to cauterize by setting fire to a cone of cotton placed over a wound; use of the *ventouses sèches* to scratch the skin or make small incisions (presumably to encourage healing); rub-downs with or without oil, after steam baths.

However, the Egypt of Larrey's time appeared to him to have vastly declined from the era of pharaohs when temples of great magnificence were built and decorated. Illustrations on the walls show surgical utensils similar to those Larrey used and evidence that the priests or practitioners were successful in using them. He regarded as worthy the still-respected works by ancient Arab physicians. But in 1798 in Egypt, medical practice was limited almost completely to external maladies. Substances intended for healing required little preparation and were used in the form of powders, opiates, or infusions. Only the popular *thériaque* required a complicated, almost ritualized preparation by sheiks. Purgatives were prepared by soaking special herbs in Nile water. Egyptians hated vomiting, which was induced only as a last resort, and enemas were performed using a cow bladder with a canula attached. Opiates were adjusted to the patient's state of health or an invalid's needs. Opium and spices were used most often to let the sick person rest and dispel melancholy. Aromatic infusions from vegetable sources induced pregnancy or prevented pregnancy.

## MISCELLANEOUS OBSERVATIONS AND RECAPITULATIONS

Larrey commented about the numbers of dogs running wild and that hydrophobia was unknown in Egypt. Dogs never entered houses and residents rarely hushed or chased them away. He concluded that the species of the dogs, plus their habits of indolence and gentle dispositions, asleep during day, active at night but with little fighting, protected them from madness.

Camels, on the other hand, were dangerous when in rut, seeming to go mad. They had symptoms of hydrophobia, foaming at the mouth, avoiding water, howling, hair bristling, and were apt to chase and try to bite both other animals and people. Sometimes in this state the camel died. Camel drivers would muzzle their animals and try to keep them apart, but bitten victims suffered greatly.

The French soldiers were very afraid of scorpions, having read reports of horrible, possibly deadly, stings. In fact many *were* stung, especially when camping among ruins, by scorpions larger than those in Europe. Yet they survived. The stings were treated with acidic lotions or *l'eau marinée*.

When smallpox raged, the plague was almost entirely absent. Inoculation was known and practised up and down the Nile. In Egypt people called it, translated from the French, "to buy the smallpox." Nonetheless, a successful inoculation also could create an infectious disease which could spread if crowded conditions or unsanitary habits prevailed. Larrey regretted that during his stay in Egypt the French did not know of Jenner's work.

The populace claimed syphilis was known in Moses's time. Women tended to neglect treatment, saying syphilis was the will of Allah, but they would drink herb infusions (*tisanes*) and take sand baths. One of the few compound medicines made by Egyptians was the previously mentioned *thériaque*, which natives used for courage, pain relief, and recreation as Europeans used alcohol. Infibulation (to deny the woman pleasure during intercourse) was performed on most girls between 7 and 10. The clitoris was cut off, a ring was installed or by sutures in the vagina was closed up "les parties dont la liberté est nécessaire à l'acte de la generation."

Childbirth, assisted by a *sage femme* (midwife) is, said Larrey, "without art." The labouring woman is placed on a chair, said to have been designed by Moses, with two assisting women to hold her down. This position is not good for mother or baby, slows the birth, and tears the mother. Larrey tried to organize a school for midwives who could, when trained, be sent out to villages. Unhappily, the curtailed tenure of the French in Egypt prevented this.<sup>21</sup>

#### CLASSIFICATIONS OF THE SEASONS IN EGYPT AND THEIR INFLUENCE ON HEALTH OF INDIVIDUALS

Dr. Larrey divided the year in Egypt into parts based on how they affected living creatures. His year began about 20 August when the Nile was in flood, although others claimed the new year began with the summer solstice. Larrey compared the Nile when in flood to a sea and the villages rose up like islands with communication by boat. The flooding increased until the autumnal equinox.

Toward the end of September the waters subsided and people began to sow clover and grain. Larrey called this time of year the *saison humide*. He would call this Egypt's winter. The wind from the west made morning and evening rather foggy. It produced ophthalmia, diarrhea, and sinus problems.

Next came the *saison fécondante* which starts about December, or the winter solstice, and is a time of harvest. The wind shifts to the east and nights are extremely cold. This is springtime in Egypt. The usually dry and arid land is covered with green growing plants and blooming trees. Nature is invigorated; animals and birds find mates; this is a healthy season.

The fourth part of the year he called the *saison morbide*, a most pernicious time for natives and foreigners. It begins about March first, and continues to the end of May. Wind comes from the south, violent and hot; it carries a putrid smell emanating from pools left by flood waters and cemeteries. During this period the *khamсын*, or 50 days of erratic weather and sand storms, causes pestilential ailments. Yellow fever returns and wounds heal more slowly, gangrene flourishes. Maladies of all kinds demand more attention from doctors. All living things are affected.

Finally the *d'été* begins about mid-June and continues until the Nile floods. The *vents étiésiens* temper the heat. Nights are cooler and less humid. The north wind rises and falls with the sun. It is very hot during the day; sweat keeps bodily functions normal. This is the most healthful season: there is little sickness among the people and wounds heal miraculously. It is a good season for caravans and troop movements.<sup>22</sup>

## NOTES

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