Contributions of the Mediterranean Peoples to the Control and Alleviation of Disease

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The main contributions of the Mediterranean peoples to the control of disease and the alleviation of the sick have been:

a the rise and development of the concept of hospital care and treatment;
b the promotion of the organised teaching of medicine and surgery;
c the adoption of practical measures for the preservation of public health on the supra-national plane;
d the elucidation of the causes and means of transmission of infectious illnesses which led to the adequate control of communicable diseases.

The Hospital Idea

Mediterranean medicine can trace its beginnings to Babylonia and Egypt. Babylonia medicine was mainly based on astrology so that various parts of the body were allocated to the Zodiac signs and the outcome of disease was worked out by observation of the particular constellation involved. As Babylonian civilization matured, the practice of medicine emerged as a separate entity and its practice was governed by a set of regulations that laid down in detail how the practitioner was to conduct himself in carrying out the various treatments. It also prescribed the scales of fees which he was entitled to charge and fixed the penalities for malpractice. These laws form part of the Code of Hammurabi (1948-1905 BC) which dates from the 20th century BC and forms the basis of our professional ethics.

Around 1500 BC the Egyptians recorded their medical knowledge on papyri. It consisted of a mixture of religious practices, incantations and pharmaceutical prescriptions for various ailments. They also stressed the importance of personal hygiene and cleanliness of house and city to ensure healthy living.

This medical knowledge of Babylonia and Egypt reached the Mediterranean through the succeeding civilisations of Greece and Rome becoming more scientific in the process. Greek medicine attained its climax of development with the physician Hippocrates who was active in the 4th century BC. He promoted a new line of thought in medicine by regarding illness as a natural phenomenon and rejecting astrological and mythological influences in the causation and outcome of disease. The supernatural element, however, was not immediately shed but persisted for many years afterwards and was responsible for the origin of the hospital idea.

The earliest proto-types of hospitals were founded at Cos, Epidaurus and other places in Greece. They centred round temples dedicated to Aesculapius, the Greek god of medicine, the son of Apollo. These temples were placed in healthy

surroundings remote from urban centres and usually in the vicinity of hot springs and medicinal waters. Buildings were constructed for the accommodation of the sick who went to these shrines to plead to the god for recovery of their health. Consulting and treatment rooms formed part of the temple complex. Thus were the first hospitals born. After obtaining a cure the grateful patient gave a thanks offering to the god which usually consisted of a model of the diseased part in silver or gold or other material; and a votive tablet recording the history of the case was hung in the temple. This hospital concept eventually crossed over from Greece to Rome. In 293 BC an epidemic broke out in Rome and as the inhabitants found themselves unable to control the ravages of the disease they asked the Greeks to lend them one of their gods for whom the temple of Aesculapius was erected in Rome.

The sick who resorted to him for deliverance from illness were motivated by religious reasons but later on the Emperor Claudius, who reigned from AD41 to 54, turned the temple into a place of refuge for the sick poor. the temple thus became a hospital although of a rudimentary form. These hospitals, where free care was given as a Christian duty, were usually rough buildings with straw on the floor for beds and where patients with all kinds of diseases were mingled together.

A more advanced type of hospital was developed by the Romans in connection with their army medical services. A chain of such hospitals was set up for the care of sick and wounded soldiers on lines similar to the field ambulance, clearing stations and base hospitals of modern military organisations.

The conquest of Spain by the Arabs from North Africa in the 8th century AD, provided a great stimulus to hospital building. Magnificent hospitals flourished in association with Arabian schools of medicine at Seville, Toledo and Cordova. From Spain the hospital idea spread to other places in Europe so that the Middle Ages saw an increase in the number of these institutions which were primarily intended for the care of the indigent sick. They were built by town administrators, by charitable bodies, by rich benefactors and by religious organisations.

One of these religious organisations was responsible for the construction of a chain of hospitals extending, at different periods, from the Eastern Mediterranean to the Maltese Islands. This was the Order of the Knights Hospitallers of St John who founded their first hospital in Jerusalem about the middle of the 11th century for the nursing of pilgrims who fell sick while visiting the Holy Land. They carried out their hospital work in Jerusalem until they were expelled from that city by the Moslems and had to return to Acre in 1191. Here they established a hospital near the centre of the city. When Acre was lost by the Christians in 1291, the Knights of St John crossed over to Cyprus where they founded a hospital for the sick,poor and pilgrims at Limassol. In 1310 they passed over to Rhodes where they again erected another hospital which was replaced by a larger one between 1440 and 1478. This building, in Gothic style, still stands in the Street of the Knights[1].

When the Knights of St John came to Malta in 1530 they founded a hospital at Birgu which became known as the *Infermeria*. It was governed by the same rules that had been in force in Rhodes and was reserved exclusively for men. Besides the sick and the wounded it also cared for orphans and foundlings. This infirmary, however, was not the first hospital to be set up in Malta for as early as the 14th century (1372) a hospital had been functioning at Rabat near the old capital city of Mdina. It was originally known as St Francis Hospital but later was given the name of *Santo Spirito* Hospital. Initially it was administered by the Friars Minor Conventuals but in 1433 it passed into the hands of the administration of Mdina. It received patients of both sexes in the 16th century but later was reserved entirely for women and foundlings.[2] It was enlarged in subsequent centuries and continued to serve the community as a hospital until 1967 when it was closed down for reasons of economy. The building, however, still stands.

When the Knights moved from Birgu to Valletta they embarked on the construction of a new hospital in 1574. This Holy Infirmary, as it came to be called, became known to all travellers who criss-crossed the Mediterranean and earned the praise of foreign visitors for its spaciousness, the competence of its medical and surgical staffs, its orderly management and discipline and the classification of the sick in separate wards according to their type of illness. When Napoleon came to Malta in 1798 and expelled the Knights of St John he took over the Holy Infirmary for the use of his troops. The British, who ousted him in 1800, did the same and continued to use it until 1920.

From the Mediterranean the hospital idea spread all over Europe as far north as Great Britain where it gave rise to such ancient hospitals as those of St Bartholomew and of St Thomas in London in 1123 and 1215 respectively.

The Organised Teaching of Medicine and Surgery

This was another development that originated in the lands of the Mediterranean in the fourth century BC. It began in the small island of Cos situated in the Eastern Mediterranean near the coast of Asia Minor. Here Hippocrates, one of the most outstanding physicians of all time, was born in 460 BC and here he spent the greater part of his life. His pre-eminence in the medical field is due to the fact that he (a) initiated the separation of medicine from mythology, mysticism and philosophy; (b) gave existing medical knowledge a systematic order and based it on the bedside observation of the patient; (c) laid down the principles of ethical conduct that to this day bind members of the profession in their dealings with the patient and with one another; and (d) was the

founder of the earliest medical school to emerge in Europe.

This school in the island of Cos gave rise to a collection of medical writings known as the Hippocratic Corpus which is made up of over 60 distinct works. Emphasis was laid on the careful observation of the patient's complaints and symptoms, on reaching the right diagnosis and on recording the history of the patient's illness. These case records are set out so accurately that the physician of today can recognise the diseases described in these medical writings. The only material relic of Hippocrates and his school that has survived is an ancient plane tree which stands in the centre of the town of Cos. Under its branches Hippocrates is reputed to have taught his pupils holding an open-air clinic.

Hippocratic medicine passed from Greece across the Mediterranean to the city of Alexandria on the Mediterranean shore of Egypt giving origin to the medical school of Alexandria in the fourth century BC where the first studies in the anatomy and physiology of the human body were carried out. Alexandrian medicine infiltrated into Rome when Egypt was absorbed into the Roman Empire (30 BC) reaching its climax in the person of Galen who, though born in Pergamos in Asia Minor, spent most of his life in Rome where he practised, wrote and taught in the 2nd century AD. Of his works only about 80 remain extant which were copied and recopied many times during the Middle Ages. Not all of his ideas and speculations corresponded to actual anatomical and physiological facts but it was not until the Renaissance that many of his theories were shown to be untenable by Andreas Vesalius (1514-64) and Ambroise Pare (1510-90) in the 16th century.

Following the fall of Rome and the break up of the Roman Empire, Mediterranean medicine passed into the hands of Arab scholars who travelled in the steps of the Moslem conquerors along the shores of North Africa into Spain.[4] They brought with them Arab translations of Greek medical works to which they added original observations of their own especially in the fields of surgery and pharmacy. Arabic medicine was especially active in the 9th and 10th centuries. One recalls such names as that of Rhases (AD 860-932), the author of a textbook of medicine; Avicenna (AD 980-1037) who also wrote a textbook of medicine which remained in use in many medical schools such as that of Montpéllier until 1650. Albucasis (AD 936-1013) who produced the first illustrated work on surgery; and Maimonides (AD 1135-1204) who among other treatises, wrote one on poisons and the harmful effects of the bites of scorpions, dogs etc. All this Arabic medical literature was carried to Sicily, Southern Italy and

Spain where schools of medicine flourished at Cordova, Seville and Toledo.

Arabic medicine declined in the mid-13th century with the break up of the Moslem Empire but concurrently with this decline another medical school was developing in the Middle Sea on a sound basis. This was the school of Salerno, some 35 miles south of Naples, which came into being about the 9th century reaching its zenith of fame in the 10th and 11th centuries. This school was the first to lay a definite course of studies and to institute a qualifying examination in medicine and to grant the title of "doctor" to medical men.

The school of Salerno started to lose ground in the 13th century when it gave way to the newly established universities in various parts of Europe. Thus, the centre of medical leadership shifted northwards to the cities of France and Italy such as those of Paris and Montpéllier, Bologna and Padua. The school of Salerno, however, survived until the 19th century when it was closed down by Napoleon in 1811. To this school and to the school of Montpéllier had flocked Maltese young men who wished to embark on a medical career as no provision for medical studies was existant in Malta until the late 18th century when Grand Master Emanuel Pinto founded our university with the Faculties of Theology, Law and Medicine in 1771. Training in surgery, however, had been available since 1676 when Grand Master Nicholas Cotoner founded and endowed the Chair of Anatomy and Surgery at the Holy Infirmary of Valletta. Only those who knew how to read and write were eligible for the course in surgery which in 1682 was fixed at ten years to ensure that the surgeons who qualified from the school were proficient in their craft. A dissection room was built in 1716 being furnished with the necessary instruments supplied by expert makers from Paris. Public lessons in anatomy with demonstrations on the cadaver were started in 1723. By the late 18th century the school became so renowned that it attracted not only Maltese but also foreign pupils from far away as the Eastern Mediterranean. With the foundation of the university in 1771, the Chair of Anatomy and Surgery was incorporated into the Faculty of Medicine. From this union has sprung and flourished our present medical school that can boast 300 years of progressive and active life with many of its graduates scattered over Europe, Australia, Canada and the United States.[5]

Preservation of Public Health

The concept of quarantine, i.e., the isolation of people, animals and merchandise suspected of harbouring communicable diseases is an old one. It is enunciated in the Bible where we read: "He is unclean; he shall dwell alone; without the camp his habitation shall be".

The Byzantine Emperor Justinian is credited with the enactment of the first quarantine laws in the 5th century A.D. but what gave the impetus to the widespread safeguarding of health by the use of quarantine measures in Mediterranean ports was the so-called Black Death or the plague epidemic that devastated Europe in 1348. As treatment was unavailing against this illness, Mediterranean countries tried to forestall its occurrence by the adoption of preventive measures. These consisted in isolating ships arriving from the Levant and Egyptian special areas of their ports and in detaining travellers and crews in *ad hoc* establishments called Lazzarettes for 40 days - an arbitrary period said to be derived from the time Jesus spent in the wilderness; hence the word quarantine from the Italian *quaranta giorni*. This measure was first enforced at Ragusa on the Adriatic in 1377. The port of Marseilles took similar steps in 1383. Venice established a maritime quarantine station in 1403 and drew up a code of quarantine regulations in 1448. This code served as a model for other countries for over 400 years.

In general the procedure laid down in the Middle Ages in the Mediterranean when a ship approached port with suspected plague was as follows. The ship was relegated to a special area of the harbour and the master was required to deposit a sum of money as security that he would not leave port before he was given pratique or permission to depart. To make doubly sure that he would not sail away the rudder was removed from the ship. Passengers and crew were sent ashore to the Lazzarette where they were exposed to the fumes of boiling pitch and afterwards washed with vinegar. Their garments were taken away; some of this clothing was burned, and some was washed, aired and "perfumed" for 50 days. Cargoes were washed with sea-water and vinegar; cloth was unrolled and hung from the rigging of the ship. The sails, too, were submerged in the sea. The vessel was fumigated by boiling pitch in cauldrons between the decks. Cotton received special treatment in the sense that the bales were broken open and their contents were thrown about by "expurgators" daily for 50 days. Severe punishments, including the death penalty, were laid down for those who tried to contravene the quarantine regulations.

Similar measures were employed on land. Thus in 1577, Naples tried to protect itself from pestilence by stationing guards at the city gates, by having sentinels, on foot and on horse-back, patrolling the city walls to prevent clandestine entrance.

The Knights of St John had evolved quarantine rules during their stay in Rhodes so that by the time they came to Malta in 1530 they had a well-developed system of quarantine. It was based on the Lazzaretto which they constructed on Manoel Island in Marsamxett Harbour which became known as the Quarantine Harbour. However, quarantine measures were already being enforced in Malta during the Middle Ages by the Municipality of Mdina as early as 1458. The Knights were very strict in the application of quarantine rules and no regard was

paid to personal liberty, property or international commerce once there was the possibility that disease, especially plague, could be introduced into the Island. Punishments ranged from the imposition of heavy fines, the burning of merchandise, of homes and of ships to the infliction of the death penalty.

In about 1600 the Bill of Health was introduced. This was a document issued by governments to sea captains and to passengers declaring the state of the public health at the port of departure. This document was then examined by the sanitary authorities of the port of arrival before the ship was allowed to discharge cargo and passengers.[6]

To keep itself informed of the public health conditions prevailing in the various ports of the Mediterranean, the government of the Order of St John maintained a regular correspondence with the sanitary authorities of such ports as Venice and Naples besides obtaining reports froms its various embassies in the capitals of Europe.[7]

The most dreaded epidemic disease was plague of which Malta, as part of the Mediterranean world, has had its share right up to 1945. Smallpox, yellow fever and cholera invaded the Mediterranean in epidemic proportions for the first time in the 19th century. By the 1850s it became increasingly obvious that the traditional quarantine regulations had not always been effective in controlling the spread of epidemic disease and that their enforcement was causing delays in the flow of commerce and the movement of passengers. However, the fear of epidemics persisted and when the First International Sanitary Conference opened in Paris in 1851 the delegates were so undecided on how to facilitate trade in the Mediterranean without endangering the public health that the conference ended inconclusively and the old quarantine measures remained in force for a very long time afterwards. In fact the production of a Bill of Health by ship captains did not cease to exist until about 1960. Meanwhile, through its quarantine system Malta safeguarded not only its own public health and that of other Mediterranean countries but also protected commercial interests against the disruption of the economic and social life that followed in the wake of epidemics that swept over the Mediterranean.

Elucidation of the Means of Transmission of Infectious Diseases

The emergence and growth of the science of bacteriology led to a better understanding of the causation and transmission of communicable diseases and to a better control over their spread. Bacteriology saw its greatest development in France and Germany thanks to the pioneering work of Louis Pasteur (1822-95) and Robert Koch (1843-1910). They discovered, among other germs, the microbes responsible for surgical infections, for rabies, for tuberculosis and for anthrax; but the Mediterranean was no less active in the search for other microbes and parasites and their vectors that were causing widespread harm in the lands bordering the Middle Sea and other distant parts of the globe.

Four of these outstanding discoveries were - the parasite of malaria and its vector; the germ of undulant fever and its host; the role of the body louse in spreading epidemic typhus; and the identification of the Phlebotomus in the transmission of sand-fly fever.

The parasite of malaria was discovered by the Frenchman Alphonse Laveran (1845-1922), a military surgeon working in Algeria in the service of the French army between 1878 and 1883. While he was engaged in the study of malaria in Bonne he discovered the plasmodium parasite while carrying out the microscopic examination of blood of patients suffering from this disease on November 6th, 1880. This discovery not only established the identity of the organism causing malaria but also stimulated interest in protozoal disease agents thus opening the field of other research workers and extending our knowledge of similar organisms. In recognition of his researches concerning the role of protozoa in causing diseases, Laveran was awarded the Nobel Prize in 1907.

Among those who built on the foundations of Laveran were Sir Ronald Ross (1857-1932) who demonstrated how the parasite of malaria was spread by the anopheles mosquitoes; and Camillo Golgi (1843-1926) of Pavia who, between 1886 and 1893, showed that some plasmodia required 48 hours and others 72 hours for their release from the red blood corpuscles and that these different periods corresponded to the afebrile intervals of tertian and of quartian fevers [8]. Another Italian investigator, Giovanni Grassi (1854-1925) of Rome, proved that the spotted-winged mosquito (anopheles) was the only genus capable of transmitting the malaria parasite to man.

The second important contribution to bacteriology from the Mediterranean was the discovery of the microbe of undulant fever. The disease is known as brucellosis from the fact that the germ was discovered by David Bruce (1855-1931) while working in Malta as a British Army Surgeon in 1886. In spite of the significance of this discovery, however, it remained unknown, for many years afterwards, how the microbe gained access to human beings. Indeed it was not until 1905 that an investigator - this time a Maltese physician - found the microbe in the blood of the goat. The man was Sir Themistocles Zammit (1864 - 1935).[9] The full cycle of the infection was thus demonstrated and preventive measures for its eradication could be taken - as in fact they were - by the enforcement of the pasteurisation of goats' milk on a national scale. Today, thanks to Zammit, undulant fever has practically disappeared from Malta and other Mediterranean countries.

Until 1909 no one knew how epidemic typhus was propagated. It was a close friend of Sir Themistocles Zammit - the Frenchman Dr. Charles Nicolle (1866-1936), Director of the Pasteur Institute of Tunis - who, on investigating typhus patients admitted to the native hospital of Tunis, found that the *Rickettsia prowasekii* responsible for causing typhus fever, was transmitted by the body louse. Because of this discovery effective steps could be taken for the control of this disease by delousing the population. For work on typhus Dr. Charles Nicolle was awarded the Nobel Prize in 1928[10].

The significance of Nicolle's discover was amply demonstrated in October 1943 when as typhus epidemic broke out in Naples where sixty new cases were appearing daily. Thanks to the knowledge that the disease was conveyed by lice, the population of Naples was deloused by the newly found insecticide DDT. In three weeks 1,300,000 persons were thus treated and the outbreak was brought to an end. This experience was repeated in Japan three months after its occupation[11].

Finally Nicolle also contributed in drawing the distinction between the louse-borne epidemic typhus and the murine endemic variety due to *R. mooseri* with its reservoir in rats and its transmission to man by the rat-flea[12].

Malta appears again on the medical stage of the Mediterranean in connection with a fever called in the past "simple continued fever" or "three day fever", now known as sand-fly fever. This infection, which is common in the Mediterranean littoral and the Middle East, had been known to British Medical Officers in Malta and elsewhere since 1799. One of the earliest references to it comes from W. Burnett of the British Navy in his 'A Practical Account of Mediterranean Fever' published in 1814 [13].

In 1908, R. Doerr, while investigating this disease among Austrian soldiers on the Dalmatian coast showed that this illness was spread by the insect vector Phlebotomus papatissii[14]. Lt. Col. C. Birth, working in Malta and Crete, confirmed this finding in 1910[15]. In the same year, the entomologist R. Newstead was in Malta searching for the breeding places of this sand-fly[16]. In 1921 the British Royal Air Force appointed a Sandfly Fever Commission to enquire into the life history of the sandfly in our island, the research being carried out at the RAF Flying Boat Base in Kalafrana. The results were published in 1923[17].

In this year two members of this commission published a paper suggesting the hygienic and environmental measures needed for eliminating the sandfly[18]. This was some twenty-years before the commercial production of DDT when the control of the sandfly with this insecticide became an easier and more effective matter.

In this brief survey I have tried to show how the lands of the Mediterranean have participated in the progress of medical research and care. Thanks to these contributions the invalidity and mortality from infectious diseases have been reduced considerably and in some cases eliminated; the hazards to health that previously accompanied expansion in trade between nations have been effectively controlled; the great economic waste in human and material resources resulting from the ravages of epidemic disease has been adequately checked; while a sound basis has been laid down for the promotion and maintenance of a healthy environment to ensure the well-being and welfare of all mankind.

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