# HYGIENE AND DISEASE IN PALESTINE

## IN MODERN AND IN BIBLICAL TIMES.

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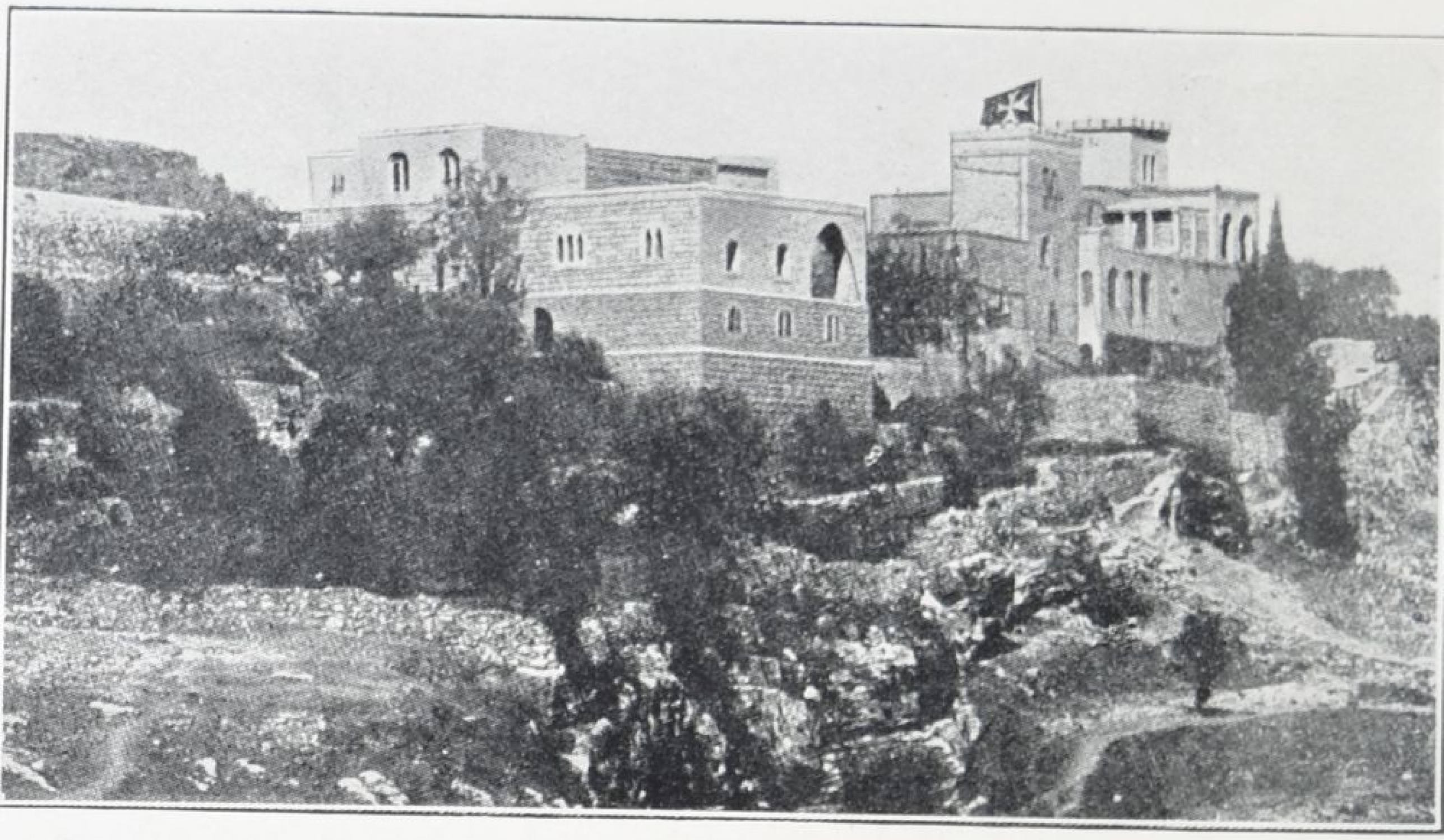

British Ophthalmic Hospital, Jerusalem.

The Royal Victoria Hospital, Damascus.

# HYGIENE AND DISEASE IN PALESTINE

## IN MODERN AND IN BIBLICAL TIMES.

*With Two Appendices.*

BY

E. W. G. MASTERMAN, M.D., F.R.C.S., D.P.H.,

*Medical Superintendent Camberwell Infirmary.*

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WITH A PREFACE

BY

ALEXANDER MACALISTER, M.D., F.R.S.,

*Professor of Anatomy, University of Cambridge.*

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# In Memory of my Friends

WHO, AFTER YEARS OF SERVICE FOR THE HEALTH AND HEALING OF THE PEOPLE OF PALESTINE AND SYRIA AS MEDICAL MISSIONARIES, LAID DOWN THEIR LIVES IN THE SERVICE OF THEIR COUNTRY DURING THE GREAT WAR, NAMELY:—

CAPTAIN JOHN CROPPER, R.A.M.C., M.A., M.D. (CANTAB.),
LATE OF AKKA, NABLUS AND RAMALLAH (C.M.S.),

DROWNED IN THE SINKING OF H.M.S. "BRITANNIC,"
NOVEMBER 21, 1916.

CAPTAIN IAN MACFARLANE, R.A.M.C., M.B., CH.B. (EDIN.),
LATE OF NAZARETH (E.M.M.S.),

DIED OF TYPHUS CAUGHT IN A TURKISH PRISONERS' CAMP,
CAIRO, JULY 18, 1917.

CAPTAIN FRANK IRVINE MACKINNON, R.A.M.C.,
M.B., C.M. (EDIN.), M.R.C.S.,
FOR 30 YEARS IN CHARGE OF THE DAMASCUS MEDICAL MISSION
(E.M.M.S.),

DIED IN DAMASCUS, DECEMBER 30, 1918.

CAPTAIN ROBERT STERLING, R.A.M.C., M.A., M.B.,
B.S. (DURHAM),
HON. CANON OF ST. GEORGE'S COLLEGIATE CHURCH, JERUSALEM,
FOR 24 YEARS IN CHARGE OF THE GAZA MEDICAL MISSION (C.M.S.),

DIED IN LONDON, OCTOBER 16, 1917, AFTER SERVING ON THE
PALESTINE FRONT.

MISS MARIAN WILSON, M.B., CH.B. (EDIN.),
LATE OF HEBRON (U.T. CH. OF SCOTLAND M.),

DIED OF ACUTE APPENDICITIS, AUGUST 1, 1917, WHILST SERVING
AS SURGEON TO THE SCOTTISH WOMEN'S HOSPITAL, ROYAUMONT,
FRANCE.

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# PREFACE.

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At the present time, when all that concerns the future of Palestine is very much in the public mind, any authoritative information as to the past, present and future sanitary requirements of the country is valuable and useful as a contribution to our knowledge. The short, popular, but comprehensive account on the Diseases of the Bible which we have here from the pen of Dr. Masterman (than whom no man knows the medical history of the country better) is a well-timed and most interesting contribution to our knowledge, which will doubtless be read and valued by all who desire the latest and most trustworthy account of the identification of Palestinian Diseases.

That the Holy Land is still, as it was in the Biblical period, a hot-bed of many diseases, which have lost none of their virulence during the post-Biblical centuries of mis-rule, is not a matter of surprise to anyone who knows the almost total absence of respect for hygienic precautions all through the later portion of its history. But there is no reason to doubt that, given the enactment and enforcement of modern hygienic regulations, it might become one of the healthiest countries in the Eastern Mediterranean area.

It has been said that the knowledge of disease is half its cure, and if those into whose hands the future of the country is committed study the record herein presented, it will prove a valuable guide in the making and enforcement of sanitary laws.

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Dr. Masterman has modestly confined his survey to the diseases mentioned in the Bible, and in this respect it is of wide interest to those concerned in their energetical identification; but as the same diseases are, for the most part, characteristic of present day conditions, his range is really wider than his title indicates, and he has drawn on his large experience for his conclusion. It is therefore not too much to say that, although his work is written in popular manner, and with a view to the utilization of his book for Biblical study, it is calculated to be of great value to those who are concerned with questions of public health in the land at the present day.

ALEX. MACALISTER.

# AUTHOR'S NOTE.

THIS condensed account of the Diseases of Palestine does not pretend to be an exhaustive scientific treatise, and on account of the conditions produced by the war it is not furnished with statistical tables which might otherwise have been included. It was originally written—under the title of "Diseases of the Bible"—as a popular sketch for the use of those who wished for such information in order to understand the Bible references to such questions as Hygiene and Disease. My old friend, Prof. Alexander Macalister, who has written at considerable length upon Biblical Diseases, etc., told me some years ago that he could then find nothing written on this subject by anyone who was practically conversant with disease in Palestine, and he encouraged me to make an effort to supply this defect. This short essay is the result.

Recently, Palestine has, in a quite unexpected way, come to have a new interest for Englishmen, and Great Britain is now apparently to have a predominating voice in its future development. Among the responsibilities which the new Government will have to undertake none is more urgent than that of improved sanitation. Our military authorities must fully realize this for during General Allenby's victorious campaign thousands of our soldiers suffered from the unhealthy conditions existing in this land, particularly in all parts of that unique rift in the Earth's surface, the Jordan Valley. This record of the pre-war conditions may still have an interest even if—as we hope—the new Administration is already doing much to revolutionize things in the direction of improvement in Hygiene.

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All the eight chapters of this book are reprinted from the *Quarterly Statement* of the Palestine Exploration Fund. I have added an appendix upon the "Water Supply of Jerusalem," much of which appeared in the *Zionist Review*, and also a list of British hospitals in Palestine. Although other nations have had more imposing buildings and a greater display of political influence, none did so much as Britain for the sick poor of the land.

E. W. G. M.

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# PART I.

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# PART I.

# DISEASES OF MODERN PALESTINE AND SYRIA.

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## CHAPTER I.

### *Race, Habit, and Food as bearing on Disease.*

It is not necessary to discuss here the very complicated ethnological relations of the various and mixed races inhabiting Palestine and Syria; for practical purposes it is sufficient to recognize three distinct classes of people distinguished by such special habits of life as to have a somewhat different liability to disease. These are (1) the nomads or bedawīn, who dwell in tents all the year round and live a pastoral as contrasted with an agricultural life; (2) the peasants or fellahīn, who are primarily agriculturalists; and (3) the town dwellers or hader, whose occupations are various. Each class shades off into the other. Thus, some of the local bedawīn live in rough houses or old ruins in the winter, and do a certain amount of primitive agriculture, housing their cattle and stores of *tibn* in the winter; and a considerable number of the fellahīn, particularly in recent years, though making their homes in their villages, spend so much of their time in occupations in the towns as to expose them to all the disease-risks of the townsfolk.

(1) The bedawīn are popularly credited, on account of their entirely open-air life, with great soundness of constitution, but it cannot be said that this is the case with the nomads of Palestine. They are exceedingly scantily clad, the poorest in actually nothing but a shirt, and their skins are exposed to all the extremes of heat and cold; their goat-hair tents are but little protection from the heat of summer or the cold and wet of winter; while, during the latter season, the atmosphere of their dwellings is commonly saturated with the irritating smoke from wood or dung. It might be supposed



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that the smoke would at least afford some protection from insect pests, but the truth is that, under such conditions, lice, mosquitoes, and other insect pests are found in abundance. Doubtless, in the days when the bedawīn possessed considerable wealth of cattle, camels, and horses, and were able both to feed well and to keep themselves in good physique by martial exercises, they enjoyed greater robustness, but now a large proportion of the bedawīn of Palestine are sallow in complexion, and constantly suffer from malarial fever, and even from pulmonary tuberculosis (consumption), from which it might be thought their out-door life would save them. Even their nomad habits do not deliver them from epidemics of small-pox, typhus, enteric, measles and whooping-cough; and the mortality is very high, especially among the young. While it is probably true that the great desert tribes are largely free from venereal diseases, this is certainly not the case with the mongrel bedawīn in the neighbourhood of the towns of Palestine, who have very low morals: syphilis and gonorrhœa are extremely common among them, and it is said that the same is the case with some of the nomads of Sinai. These same bedawīn are described as being peculiarly liable to rheumatism. No class are greater fatalists, and in the larger number of cases of illness the patient is left uncared for, even, as the writer has witnessed, when the sick one is a cherished son. The bedawīn have remedies of their own, but many appear to be the result of the inspiration of the moment rather than of any tribal lore. The food of these nomads consists of unleavened bread, made of coarsely ground wheaten flour, burghul (bruised wheat, boiled), rice, lebban (sour milk), cheese, dates and fresh fruit when they can be obtained; occasionally, as on a feast, a sheep is killed and there is a gorge of meat. A great number of them suffer from chronic dyspepsia, the pangs of which they usually ascribe to intestinal worms; these, it is true, they also have in plenty. Child-birth is, as a rule, accomplished with extraordinary ease. Although these nomads, in a remarkable manner, survive injuries received in their fights, their constitutions present very little resistance to acute diseases, particularly perhaps to pneumonia, and they succumb to what any soundly constitutioned European would successfully resist.

(2) The fellahīn are ethnologically a very mixed race, and distinctive physical characteristics are found in certain villages or groups of villages. In general, the poorest both in physique and in possessions are found in southern Palestine. The great masses of the

fellahīn—like the bedawīn—are nominally Moslems, but they know but little of the religion which they profess, and follow a cult of traditional religious customs, often quite at variance with their orthodox belief. There are a certain number of Christian villages scattered about the land where, as a rule, the houses and surroundings are more comfortable than in the villages of the Moslems. In northern Palestine, particularly, the most varied races and classes dwell side by side—Christians (in several distinct sects), Jews (in "colonies"), Sunnite Moslems, and Metaweleh, Druzes, Moslem Circassians, Turkomans, and Algerians. Even those occupying villages within sight of each other will often have but little social intercourse. All over the land the custom of intermarriage within the very narrow circle of a single village, or of a small group of villages, is the rule. This constant interbreeding is naturally prejudicial to health, and must greatly concentrate the tendency to inheritance of disease. The houses of the fellahīn are usually constructed of very loosely built walls, with flat mud roofs, unprovided with parapets (Deut. xxii, 8), and in many parts of the land without even chimneys. These ill-made walls, however, have the advantage of allowing free ventilation even when, as is the rule, all windows and doors are closed at night. Most dwellings swarm with vermin. In some parts of the land (*e.g.*, Ḥaṭṭin, Banias, etc.) the inhabitants sleep in booths constructed on the roofs during the summer months, when the vermin are most active. A witness to the commonness of the presence of body lice is supplied by the exclamation frequently used in northern Palestine, "May God not remove them [*i.e.*, the lice] from me!" because the sudden departure of these pests from anyone is considered a sign of mortal sickness. The village streets are narrow and very irregular. Heaps of refuse accumulate in corners, and a huge dung heap—the breeding-place of countless myriads of flies—dominates the habitations. There are, with very few exceptions, no sanitary arrangements, and the whole village is often surrounded by a narrow area of human excreta which the fellahīn never take the trouble to cover with earth, and which, when the rains come, is, in many cases, carried into the source of the water supply. Although the native of the land has a keen appreciation of good water when he sees it, and will laud the virtues of fine springs in extravagant language, he is often very careless about his domestic supply. In many places water is very scarce over much of the year, and little can be spared,



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or is used, for personal cleanliness. On the other hand, the young lads, in many villages, bathe daily in the tank or pool which supplies water for domestic use. The house-floors, being usually of beaten earth, can never be properly cleansed and harbour the accumulated filth of years. The fellah has the advantage neither of the nomad's periodical migration to a clean site nor of the thorough cleansing which the town-dweller is able to give periodically to his stone-paved floor. From want of personal cleanliness and the impregnation with sewage of the food, especially the salads, intestinal worms are exceedingly common. The food of the villager, in addition to the articles mentioned as eaten by the nomad, includes a large amount of fresh and dried fruits, especially figs, grapes, apricots and dates, and in their seasons, fresh melons, gourds and cucumbers. Cooked with meat he has rice, vegetable marrows, egg-plant (*solanum*), bārmeyeh (*Hibiscus esculentus*), tomatoes, etc. Eggs, chicken, and meat in general are eaten more commonly than with the bedawīn, and in certain districts fish is also a usual article of diet; but the majority of the villagers never touch it. As with the bedawīn, so with these people, there is a great prevalence of dyspepsia, due partly to the common custom of making but one large meal daily, in which half-cooked bread and unripe fruit largely figure, partly to the over-eating which occurs at feasts, and perhaps most of all to the perpetual over-drinking of water (a habit in itself often due to dyspepsia), which distends the stomach and dilutes the gastric juices. This last is even more true of the bedawīn, who have often to wait for a long time before getting a satisfactory drink. The fellahīn suffer much from the cold and wet in winter, the majority make but little change of raiment, and those who can do so cower over their small charcoal fires during the long, heavy, rains of the winter months. They need sunshine for their natural life, darkness and wet are things to be got through as well as possible—preferably in slumber.

(3) Then we turn to the hader, or townsfolk. It is necessary to distinguish to some degree between the Moslems, the Christians and the Jews, and, in the case of the last two, to differentiate between the true Orientals and the more or less orientalized Europeans, because each class has different social customs and modes of life, leading to a different liability to disease. For example, venereal diseases are distinctly rare among the Jews of Palestine, not very common among the oriental Christians, but fairly common among

the more well-to-do Moslems. This is said to be increasingly true the nearer we approach to Egypt; at Gaza, for example, a very high percentage of the people, according to the late Rev. Canon Sterling, M.B., suffer from syphilis. The morals of the Jews of the Holy Land, particularly of the European immigrants, are good; they, as a class, are much held in check by religious motives. Public vice is uncommon everywhere, but on the other hand a large proportion of the more notorious "public women," especially in Damascus, are Jewesses. Among the Moslems, unnameable vices are deplorably common, and they are viewed by the rank and file with but little horror. The kidnapping of boys for vile purposes is done in some of the larger Moslem centres in broad daylight, and the victims, not uncommonly native Jews, have but little redress. The writer has had many such cases under his care.

As a whole the towns-people enjoy better houses, better clothes and better food than the fellahīn; and perhaps, as a class, oriental Christians know best how to live comfortably. Food is much the same as with the fellahīn, with the addition of great quantities of sweets and nuts, sweet sherbets and coffee, the first mentioned, particularly, leading to rapid decay of the teeth. The villager with his coarse food has usually excellent teeth, but a few months of town life leads to rapid deterioration. Milk is, by a long-standing instinct, always boiled—a custom which doubtless saves many lives from Malta fever, enteric and tuberculosis. In the towns, dyspepsia is also somewhat common, much of it being due to the habit of cooking food with oil, olive or sesame, instead of, as with the fellahīn, with *semen* (boiled butter). The orthodox Jews, always, and the native Christians, at fast seasons, are obliged to cook their meat and vegetables in this way, and experience shows that food so prepared is not easily digested.

The sanitary arrangements of all the towns are still extremely primitive. Drain traps are practically unknown, except in European houses and institutions. The "waterclosets" are usually in close proximity to the front door, or the kitchen, or both; and the entrance to the main drain or cesspool, where there is often an accumulation of years, being quite untrapped, the effluvia is at times almost unbearable. In Jerusalem, which should be a place easily drained, a water-carriage system of main drainage has been made, ancient sewers being utilized, but as there is no system of flushing these badly constructed, stone-built channels, sewage

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stagnates in them during the whole dry season, poisonous gases make their way freely into the houses and streets, and the liquids impregnate the surrounding soil for a considerable distance, and, without doubt, in places reach the neighbouring cisterns. When the heavy winter's rains fall, the accumulation of months is carried down the main sewer, emerges in the valley of the Kedron just below the village of Silwān, and flows down the valley in close proximity to the Bīr Eyyūb (Job's well—the ancient 'en-Rogel), the water of which is carried to the city for many domestic purposes. Much of the fresh sewage is distributed over the gardens to the south of the city, in which are grown quantities of the salads, cauliflowers, and other vegetables supplied to the city. One effect of these and such-like arrangements is the universal occurrence of "round worms" among the native population, and here too we have all the necessary antecedents for the propagation of enteric fever and cholera.

# CHAPTER II.

*The Climate and Water Supply in relation to Health and Disease.*

It is not always realized that Palestine belongs to the sub-tropical zone, and lies farther south than not only every part of Europe but also of most of Morocco and Algiers, of all Tunis, and of the whole of the United States of America with the exception of Florida and parts of Texas and Louisiana. The latitude of Jaffa (32° N.) is practically that of Amritsar in India and Shanghai in China. Moreover, in the great central rift of the Jordan Valley the climatic conditions must be described as tropical.

The land as a whole is fairly well supplied with rain, but the rainfall is very unequally distributed throughout the year, extending as it does over little more than six months. January, February, December and March are—in this order—the wettest months; there may be fairly heavy showers in October, November, April and, exceptionally, even in May. It is very unusual for any rain to fall in June, July, August and—except quite at the end of the month—in September. The amount of the rainfall is liable to considerable annual fluctuations and varies with the altitude. In Jerusalem, regular daily observations have been taken since 1860. The heaviest season's rainfall was 42·95 inches in 1877–78, and the lightest 12·5 inches in 1869–70. The mean annual fall is about 26·5 inches. There seem to be cycles of greater and lesser falls, dry spells and wet coming in groups, but no definite rhythm has been observed. In the Maritime Plain, observations have been taken at Jaffa (P.E.F.) and at the German colonies of Sarona and Wilhelma, in the Jordan Valley at Tiberias (P.E.F.) and at the Jewish colony of Melhamiyeh. The rainfall in the Maritime Plain is less than in Jerusalem—perhaps about 25 per cent. less—and that in the neighbourhood of the Lake of Galilee still less. Fortunately, these regions are far less dependent upon rainfall than the mountain districts. We have no regular observations recorded in the Dead Sea district, but the rainfall is very much less than in any other part of Western Palestine. On the edge of the eastern plateau

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there is a rainfall comparable with that on the highlands to the west, but it is only a fringe of a few miles which is so benefited. Where once the water-parting is passed and the gentle eastward slope begins, the rainfall rapidly diminishes in amount, and it is very scanty indeed east of the Hedjaz Railway.

In the late summer heavy clouds come up from the west, and during many nights the higher lands—especially in the north—are drenched in "dew" which does much to fatten the grapes and olives.

In the highlands the springs, though not infrequent, are seldom copious, and in many parts the people of the land have from early historic times resorted to cisterns to store the rain, both for their domestic use and for their vineyards. In Jerusalem, the water of the intermittent spring 'Ain Umm ed-Deraj, "the Virgin's Spring" (Gihon of the Old Testament), and of the deep-lying spring in Bîr Eyyub (En-Rogel of the Old Testament) is brackish and impregnated with sewage. I have examined samples of both these waters and found abundant chlorides, free ammonia and nitrites. The main source of drinking water is consequently the numerous rain-filled cisterns—public and private—which have been excavated in the rock or, in parts of the city, in the overlying soil. In Roman times—perhaps even somewhat before—two systems of aqueducts, known respectively as the "High Level" and "Low Level" aqueducts, brought water from the neighbourhood of Wady Artas, where to-day the three great reservoirs known as "Solomon's Pools," now much out of repair, bear witness to the thoroughness of these great "waterworks." Wady Artas is $7\frac{1}{2}$ miles directly south of Jerusalem, but the low level aqueduct, which alone remains more or less complete, ran 13 miles along the hill sides to reach the city. Two additional systems of aqueducts brought a supply also to these pools, a chain of wells connected up by an aqueduct, known as a kariz, which enters the Wady Artas by a deep rock-cut tunnel, and an aqueduct, similar in construction to the low level aqueduct, which runs 28 miles along the hill sides from Wady Arrūb—only 5 miles to the south in a direct line. Both these extensions have been long out of repair, but from the springs in Wady Artas, by utilizing the low level aqueduct in part and replacing it with a 4-inch iron pipe elsewhere, a feeble stream of water used, before the war, to reach Jerusalem. From this pipe the inhabitants of the city were able to fill their vessels with water of a fair quality, but it was a poor

enough supply for a great city. The British engineers, after the occupation of the city, estimated the total storage capacity in cisterns in Jerusalem at 360,000,000 gallons, ranging from the great cisterns of several million gallons capacity in the Haram to the small domestic cisterns under or near every house. European residents were accustomed in years gone by to have water brought in jars or tins from the abundant fountain at 'Ain Kārim, but this has often proved unsatisfactory as the bearers are untrustworthy.

As far as health is concerned there is not much wrong with well-stored cistern water. It is a little "flat" but has none of the disagreeable taste of rainwater in European cities, which is contaminated by a smoky atmosphere. Careful people ensure cleanliness of the roofs by allowing the first day's rainfall in each season to run away for a few hours. Cisterns must be periodically cleaned out, but it is surprising how small is the sediment deposited in even the largest cistern, where only the roof-water is collected. Most cisterns are rock-cut and carefully cemented with an impermeable cement, in the making of which the ground-up fragments of broken—often ancient—pottery are used. Water so stored, if originally pure, keeps sweet and good for a long while and, when the sediment is settled, is quite bright and clear, although a Pasteur filter shows that there remains constantly a small quantity of undissolved earthy impurity. In some respects, the system of private cisterns is probably safer than a doubtfully-managed public supply. A water-borne disease, such as enteric fever, cannot be carried all over the city. On the other hand, the small cisterns in the houses of the poor not infrequently leak, and those in the city, being often made in the soil, may become infected with sewage. They are also mostly open and, on this account, liable to contamination from many sources. Mosquitoes—*Anopheles*, *Culices* and *Stegomeyer*—breed in them in countless numbers, and the *Anopheles* are especially dangerous as the carriers of malaria. Cisterns should be systematically inspected, repaired and kept closed to the entry of mosquitoes. The only satisfactory plan is to provide them all with pumps instead of the primitive hand-buckets let down through a wide, open well-mouth. (See *Appendix* I.)

The Syrian native esteems "living" (spring) water very highly, but I have known people, accustomed to the soft rainwater of Jerusalem, who were digestively upset by drinking from the beautiful springs of Nablūs, the water of which is very hard from a high percentage of lime and magnesium salts.

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In the villages water is, if possible, brought from springs, even at a considerable distance, for drinking purposes, but in the late summer in many places the fellahīn and bedawīn have to make shift with water of a very inferior quality, obtained from anywhere they can get it.

With regard to the temperature, there is a great difference between various parts of the land. Upon the high mountain plateaux of Judæa and Galilee, in parts of Central Palestine, and in much of the higher lands east of the Jordan, the winter months are bracing, though the spells of heavy rain, lasting often a week or more at a time, are trying in a land where the dwellings are built rather for heat than cold, and where fuel is scarce. To many of the poor the winter is a time to be endured with the reflection that it does not always rain. Between the bouts of rain are spells of bright sunshine and pleasant warmth. At times at Jerusalem, Hebron, and such mountain elevations, snow falls heavily, and occasionally lies on the ground for some days. It is welcomed by the agriculturalists, as the slowly melting snow thoroughly moistens the soil.

The mean temperature in the shade in Jerusalem during the three colder months (January, February and March) is 48°·7 F.; in the Maritime Plain (Wilhelma) 56°·4, and by the Jordan (Kasr Hajla) 69°·2. During the six months for May to October (inclusive) the mean in Jerusalem is 71°·6, in the Plains 76°·9, and by the Jordan 91°, but this hardly conveys an idea of the actual heat experienced. The mean of the maximum temperatures in the shade of the four hottest months is 84°·3 in Jerusalem, 96°·4 in the Plains, and 112°·5 at the Jordan. In Jerusalem itself, though temperatures over 90° are common in the summer, temperatures over 100° are infrequent.

The heat in the higher parts of Palestine is much mitigated by the cool westerly breezes which, with considerable regularity, blow from the middle of the forenoon until some time near sunset, and a north-westerly breeze is very common all the summer night, making the hours of sleep refreshing. The most unhealthy and disagreeable days are those when the dry, hot sirocco blows from the south-east ("a dry wind of the high places in the wilderness," Jer. iv, 11), sometimes for several successive days and nights. At such times those who have good stone houses keep the windows and doors closed, and to step outside from such a house is like stepping into the neighbourhood of a furnace. The wind is intensely

dry and, at times, loaded with fine desert dust, producing a haze; vegetation languishes, the leaves droop, and most people—especially, perhaps, Europeans—feel varying degrees of discomfort. During and after a bout of such a wind, the increase in "fever" and other illnesses is marked. May, just after, and September and October, just before the rains, are the worst months. In midsummer sirocco is rare, and in the winter the south-east wind, though dry, is cold and bracing.

Taking Palestine as a whole, for those who do not mind a fairly high temperature in summer, the clear pure air and cloudless sunshine are very enjoyable. Compared with Egypt the highlands of Palestine enjoy a better summer climate for Europeans, though falling far short of some parts of the Lebanon. But even so, in my experience, all the Europeans I have known have been benefited by occasional change to the more temperate zone, and some ladies find residence in high altitudes, such as Jerusalem, trying to the nervous system. In winter the coast and the Jordan Valley, *e.g.*, Tiberias and Jericho, are delightful; the latter, however, for three or four months only, and even then special precautions must be taken against malaria.

Mention must be made here of local means provided by nature of treating disease. Many have found the Dead Sea water beneficial for rheumatism, but more definitely medicinal in their properties and more sanctioned by the custom of centuries, are the hot sulphurous springs which occur at many places in the land. The groups of springs at Tiberias, the valley of the Yarmuk, and in the Wady Zerka Ma'an, a valley opening into the Dead Sea from the east, were all famous in Roman times as health resorts, and are all still used by the indigenous inhabitants. Only at Tiberias has any attempt been made at providing accommodation for the bathers, and that is ill-managed and far from clean. It is to be hoped that any new régime in Palestine will recognize the value of these sites for the sick, and make arrangements that they may be used to full advantage under proper medical supervision.

The question may well be asked at the present time how far has Palestine a climate suitable for Europeans wishing to make permanent homes there? At present malaria and other diseases are recurring scourges which greatly increase the danger and discomfort of those who would live there. But supposing these can be in places banished and in others mitigated, what is likely to be the effect on the European and his family who make the land their

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home? My impression is that in the higher mountain regions many Europeans may with care live comfortably, if they learn to restrain their energies, especially in the hot months, and their children can, with special precautions, be reared in health. I have my doubts as to whether a succession of generations, where the children do not have the benefit of visiting Europe for a period of years in their youth—as is the case with most Europeans to-day—would grow up such a sturdy stock as those reared in northern climes. In the Maritime Plain European families, especially young children, would probably suffer from the much prolonged sub-tropical heat, and visits to the highlands part of each summer is desirable if possible. Schools for such children might advantageously be situated in the mountains.

Most of the Jordan Valley is quite unfit for European families. It is intensely malarious, and this disease is unlikely to be eradicated here. Though the individual—the hardy adult workman, whose work lies there—may, by living in a mosquito-proof house and taking quinine, protect himself, it is no place for a family except for a few months in winter. The families of those whose work lies there should live in the mountains, and ready means of access, by tram or train, should be provided for the overseers. In the deepest parts of the Jordan Valley, *e.g.*, round Jericho, etc., the actual manual labourers should, I suspect, be of negro stock, as are so many of the people there to-day.

# CHAPTER III.



THE most characteristic and important of the diseases of Palestine is Malaria in its various manifestations. Practically speaking, it occurs all over the land and affects every class of its inhabitants. It is very prevalent in Jerusalem, especially in late summer. Recent investigations have shown that during these months (August to October) 27·30 per cent. of all the children actually attending school have malarial parasites in their blood; and on examination, the blood of 7,771 persons of all classes and conditions revealed parasites in 26·7 per cent. The percentages were remarkably divided, being 40·5 per cent. among the poor Jews, 31·1 per cent. among the Moslems, 16·4 per cent. among the native Christians, and 7·2 per cent. among the Europeans. Practically, the percentage is an index of social environment and hygienic surroundings, the Europeans in particular having learned the lesson of prevention and early cure. Malaria occurs, though as a rule to a lesser extent, in all the towns and villages in the mountain region, especially those bordering on the Jordan Valley.

The incidence of malaria is now known to depend very largely on the water supply of a district and the nearness to areas where the fever lingers longest throughout the year, because the healthy are infected from the sick through certain kinds of mosquitoes, which pass the larva and pupa stage of their lives in water. Five species of the sub-family *Anophelinae* have been identified in Palestine, all of which are probably malarial-parasite carriers, viz., *Anopheles Maculipennis* (the common *Anopheles* of Jerusalem), *Pyretophorus Palestinensis*, *Pyretophoris Sergentii* (only as yet identified in Galilee), *Myzorhynchus Pseudopictus* (common in the Huleh marshes), and *Cella Pseudopictus*. Of these the first two are the most widely distributed and important. The usual situations of breeding of the larvae of these mosquitoes are the marshy pools and sluggish streams of the low lands; in the neighbourhood of Jaffa and at many places on the coast, especially around Caesarea and the neighbouring district, such semi-stagnant pools occur in numbers. In Jerusalem,

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the larvae of the two first-mentioned varieties breed in countless numbers in the semi-closed rainwater cisterns attached to almost all the houses, and it is therefore little wonder that malarial fevers are there continuously propagated. There are many villages and small towns where there are no suitable breeding grounds, and in such places malarial fevers are rare. The forms of malaria are the Tertian (occurring every third day, that is, with one day's interval), the Quartian (with two days' interval), and the Tropical, or double Tertian, where the fever is remittent but not intermittent. The only satisfactory means of distinguishing the three forms lies in microscopical examination of the blood in all cases. This we did for one whole year in all cases coming to my hospital, as far as possible on the first occasion of any given attack of fever. Out of 2,166 such cases, we found parasites in 46·5 per cent., and of these cases 25·5 per cent. had Tertian parasites, 27·4 per cent. Quartian parasites, and 47·1 per cent. Tropical or malignant malarial parasites: many cases were doubly infected, and some had all varieties at one time. Almost all the Tropical cases occurred in the hot months, July to November, and no fresh infections occurred in the cool weather, because this particular parasite cannot develop in the body of the mosquito in so cool a temperature. Were it not for the continual re-infection of the inhabitants by people returning fever-stricken from the tropical Ghor, this, by far the most dangerous form of malaria, would die out in the mountains. The closing of cisterns, the destruction of the larvae by putting a small quantity of petroleum on the surface of the water (which in no way spoils the water for drinking purposes if the water is taken from some depth by means of a pump, and in any case evaporates in a few hours), and the isolation of the sick within mosquito-proof curtains or buildings, are some of the means which have already been introduced to diminish infection. The prophylactic use of quinine has also been tried with considerable success. In the case of many European houses, the use of wire netting for windows and doors has greatly reduced the number of these pests and almost entirely prevented malaria. The systematic carrying out of well-recognized measures might reduce malaria, in Jerusalem at any rate, to a minimum. The loss of life, particularly infant life, through malaria is terrible; in many districts every infant in arms will be found to have an enormous "ague cake" (enlarged spleen), to be anaemic and often dropsical. The anaemia caused by malaria lays the victims open to

infection by various other diseases on account of their reduced constitutional resistance, and makes them anxious cases for surgical operations as they are specially liable to haemorrhage. Malaria is thus directly and indirectly responsible for more deaths among children and young adults in many parts of these lands than any other disease. During recent years a number of cases of Blackwater fever have occurred: they have been almost exclusively among Europeans—Germans and immigrant Jews—and chiefly in the "colonies" around Jaffa or in the upper end of the Jordan Valley. In some years the disease has assumed a great virulence and the mortality has been very high. Even in Jerusalem cases occur from time to time among the residents.

Enteric fever always endemic, at times occurs in epidemics. It is particularly fatal to Europeans; doubtless many of the native children suffer from mild attacks in infancy and are, later in life, more or less immune. Of other fevers, typhus, influenza, and (on the coast) Dengue fever all occur in epidemics. Sporadic cases of Malta fever are seen at times, and also *Spirillum* (relapsing) fever. Measles, rubeola, mumps, whooping-cough, and chicken-pox are almost always to be found among the children; the first-mentioned at times bursts forth with startling severity.

Small-pox when it sweeps through the land, has a very high mortality; vaccination is but half-heartedly carried out even in the large towns, and scarcely at all in the villages. I have known cases of unvaccinated Europeans—travellers and residents—being fatally attacked. Inoculation is still resorted to at times, with terrible results.

Scarlet fever appears to have been recently introduced, and its toll of victims in the towns has been enormous.

Diphtheria occurs from time to time, but probably less so—paradoxically enough—than in the more sanitary cities of Europe.

Dysentery is most commonly of the Bacillary variety and complicated with malarial attacks, but amoebic dysentery also occurs not infrequently, a large proportion of the cases being fatal. Tropical abscess of the liver is by no means uncommon, as a sequela of this form of dysentery.

Cholera, known to the natives as *howa el-asfar* ("the yellow wind"), appears in severe epidemics at intervals, with an enormous mortality. In nothing does the fatalism of the ignorant natives appear more prominently than in their attitude towards this

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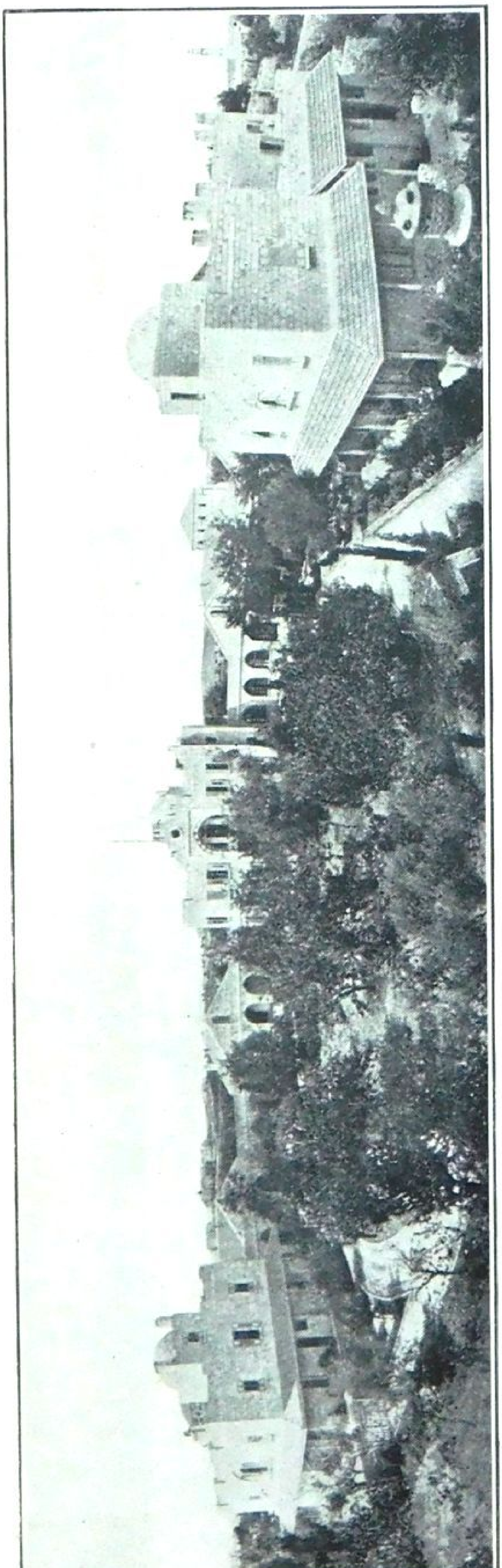
disease. In spite of all warnings, they will wash the clothes of cholera patients in the village water-supply; at Tiberias, during the terrible epidemic of 1902, many of the people could not be induced to drink the boiled water freely and liberally supplied to them by the resident Scotch doctor, but used this for washing their clothes and drank of the sewage-infected lake-water at their doors. It is not wonderful that the epidemic decimated the town. Fortunately, epidemics of this disease have been rare during the last half-century.

Plague has not occurred in epidemic form in Palestine since the first third of the nineteenth century, though sporadic cases have been detected and isolated at the ports; in earlier ages it swept over the land with terrible effect.

Erysipelas is by no means uncommon among the town-dwellers, many cases contracting infection at the site of the "issues" the people make and keep permanently open on their arms and elsewhere with the idea of benefiting their chronic eye-diseases. Tetanus occurs occasionally, and cases of hydrophobia from the bites of camels, jackals and cats, as well as pariah dogs, occur annually. The Turkish Government, through the local authorities, assist all such cases, when needing financial help, to go to Egypt or Constantinople for treatment by the Pasteur method, and just before the war the "International Health Bureau" established a small "Pasteur Institute" in Jerusalem, but the fellahīn have but little belief in any European assistance in this disease.

Acute rheumatism is fairly common, and is responsible for a large proportion of the cases of valvular disease of the heart. Such cases do badly on account of the poor food, the anaemia produced by malaria, and, in the cases of women, the very youthful age of marriage, frequent child-bearing, and hard life generally. The closely allied disease, chorea (St. Vitus's dance), is not uncommon. Chronic rheumatoid arthritis is commoner among the Jews and other European residents than among the fellahīn.

Next to malaria the disease germ most responsible for death in Palestine and Syria to-day is Tubercle. The increase in tubercular disease in the land during the last few years has been appalling. Tubercular disease of the lungs (*phthisis*), of the bowels (*tabes mesenterica*), of the bones and joints (producing caries of the spine, hip disease, etc.), and of the lymphatic glands, occur everywhere. Cases of Phthisis (consumption) are often exceedingly acute, even when pure air and a semi-outdoor life are secured. This is due, doubtless,



English Mission Hospital, Jerusalem.

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in many instances, to the mistaken kindness of friends, who quietly allow patients to refuse nourishment when there is a disinclination for food. There is a growing dread of infection in this disease, and many poor sufferers are shockingly neglected by their relatives, who are afraid to associate with them. There might be a fine field for philanthropic effort in the establishment of efficient sanatoria for such cases. There is already one such in Syria, in the mountains north of Beirut. The increase in phthisis is no doubt partly due to the great number of cases of this disease which have been sent to the land from other countries. Jews from Russia, so infected, used constantly to arrive, advised by their doctors to try the pure air of Syria. Doubtless, too, many dwellings become riddled with tubercle bacilli from cases of advanced disease, who pass months crouched up in dark corners, spitting infective sputum all over the floor, and in a state of filth and neglect. A great deal of tuberculous meat, which is rejected as *tarīf* (ritually "unclean") by the Jews, is freely sold among other classes. Oxen and cows are not readily killed while useful, and their failure of strength in ploughing or in milk-production is often due to tuberculous disease; they are thus peculiarly liable to come into the hands of the butcher in that condition. With respect to tubercle of glands, bones and joints, it is safe to say that the majority of the severe operations performed by surgeons in Palestine are for the treatment of such conditions. Caries of the spine, producing the crook-backedness of Lev. xxi, 20, is by no means rare. It would appear to be considered a merit among the Jews for a man to marry such a deformed woman.

Leprosy is not a common disease but it infects all classes—Moslems, Jews and Christians: there are in all Palestine not more, perhaps, than 250 lepers, most of them segregated in Jerusalem, Ramleh, Nablūs, or Damascus, where they live in houses provided by the Government. The fact, however, which the writer has recently observed, that a good many cases are to be found unsuspected among the villagers in some parts of the land, makes the above estimate a little uncertain. The disease occurs very sporadically without any evident cause. For practical purposes it may be considered incurable, though the rare cases of the pure "anaesthetic" form—where the peripheral nerve trunks are chiefly involved—live many years, and, after a time, the disease may cease to progress. Tubercular or "mixed" forms, in which the skin is invaded by nodules of new inflammatory deposit produced by the presence of



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masses of leprosy baccilli, are much more rapidly fatal. Seven or eight years is the average length of life from the time when the symptoms are first recognised. The later stages of this disease are, in this—the common—form of the disease, attended by horrible mutilation. The fingers and toes, and sometimes portions of the arms and legs, ulcerate away; the eyes are always affected and the eyelids are distorted: the nose, cheeks, mouth and especially the palate, are swollen and ulcerated; the face gradually loses its expression, and often becomes an object of horror; the voice becomes hoarse, and, at times, reduced to a whisper, through ulceration of the vocal cords. In the last stages the man is really a "mass of corruption," but fortunately for him the intellectual powers are gradually dimmed, and the poor victim does not realize his position. In purely "anaesthetic" cases unsightly contractions of the hands and feet due to paralysis of certain groups of muscles occur, and the condition, though permanent, sometimes remains without further progressive deformity for years. The disease, though in a low degree infectious, is not hereditary, and the children of lepers, if isolated from their parents early enough, may entirely escape the disease. This has been demonstrated many times in connection with the Moravian Leper Hospital in Jerusalem.

Rickets is a disease by no means uncommon in the towns, particularly among some classes of Jews. Infantile diarrhoea is a cause of great mortality. Syphilis, while by no means so prevalent as in European lands, is not uncommon among the town-dwelling Moslems of the middle and upper classes, but on the whole it is of rather a mild type. The relative infrequency of this disease has without doubt much to do with the rarity of chronic nervous diseases such as locomotor ataxia.

*Nervous diseases* as a whole are much less prevalent among the indigenous inhabitants of these lands than in the homes of higher civilization and more strenuous life. Hemiplegia, due to arterial sclerosis or embolism, infantile paralysis, epilepsy, and *paralysis agitans* are all, however, fairly frequently met with. Among members of the Jewish race, hysteria, hypochondriasis, sciatica and other neuralgias and migraine are all common.

Diabetes appears to be peculiarly common among this people. The writer has, however, seen several cases among Armenians and also, to a less extent, among the native Syrian Christians and even the fellahīn. Diabetic gangrene is a common complication.

Reference has previously been made to the extreme prevalence, among all classes, of chronic dyspepsia. Haemorrhoids (piles), due to portal congestion, are very common, particularly among the Jews, who are accustomed to the regular use of alcohol. Appendicitis is a rare disease among the bedawīn and fellahīn; among foreign residents it is quite as common as in home lands.

Intestinal worms of all sorts are frequent in every class. "Round worms" occur in some individuals in such quantities as to give rise to the most alarming symptoms—suggestive even of peritonitis. Tape worm (*Taenia saginata*) is exceedingly common, and difficult of real cure. It is introduced by means of under-cooked (diseased) meat, and it is noticeable that the Jews, although their meat is inspected by butchers certified by the Rabbis as competent, are very liable to it. Hydatid disease, due to the *Taenia echinococcus*, is by no means unknown. These are not however the only "worm-like" human parasites in Palestine. Wounds and "running ears" not uncommonly become full of maggots; ticks from dogs and horses occasionally attach themselves to the skin of the negligent; leeches (*Limnatis nilotica*), which abound in many wayside springs, are in some districts not uncommonly introduced with the drinking water, lodging themselves at times in the mouth, naso-pharynx, or larynx and giving rise to intermittent buccal haemorrhages, and in some cases to extreme dyspnoea. The "guinea worm" (*Dracontiasis medinensis*), though almost certainly not indigenous, is not uncommonly found in the feet and legs of those who come from Arabia or Central Asia.

With regard to non-tubercular *Lung diseases*, spasmodic asthma is very prevalent in Jerusalem; pneumonia is a common cause of death, especially among the bedawīn and the fellahīn; pleurisy and empyema are likewise frequently met with. Chronic bronchitis and emphysema are common, the latter being sometimes due to the excessive use of the *narghile* ("hubble-bubble").

Bright's disease and, in some districts, calculus of the kidney and bladder, are all familiar diseases, even in children.

True Cancer (*Carcinoma*) in all its forms appears to be less common among the natives of this land than in our home lands, though evidently the climate has nothing to do with this, because Europeans suffer from it quite as frequently as in Europe. Sarcoma is found in all classes.

*Congenital deformities*—club feet, cleft palate, hare-lip, abnormal numbers of fingers and toes, etc.—all occur much as in Europe.



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There is no doubt that many children with severe congenital deformities are "put away" at birth. With regard to supernumerary fingers and toes, there appears to be a feeling that to remove such, even when very unsightly and worse than useless, is an impious act. Hernia, both congenital and acquired, is frequently met with, and in recent years great numbers of people all over the land have submitted to "radical cures"; they do not take kindly to trusses.

*Skin diseases*, so often a result of continued want of personal cleanliness, are very common. Eczema, lichen, *impetigo contagiosa*, ringworm, favus and scabies are ever present in all the town population. Herpes, *erythema nodosum*, urticaria, and lupus also occur. Oriental boil—the so-called "Aleppo button"—is extremely frequent in Aleppo and its neighbourhood, and also at Baghdad; but cases of this disease in Palestine are almost always from these localities. The writer never saw a genuine case which originated in Palestine. There is a peculiar eruption known as the "Jericho boil," which is common in the summer months in the neighbourhood of Jericho and among some of the bedawīn living near the Jordan. In its chronic nature and subsequent scarring, it bears some resemblance to the true Oriental boil. The destruction of tissue is, however, much less, the lesions are usually multiple, and they are by no means exclusively on the exposed parts of the body.

*Eye diseases* are, and probably always have been, very prevalent in the Holy Land. The great majority of the cases of blindness are due to the results of acute ophthalmia or to small-pox; others are from injuries, cataract, glaucoma, or leprosy. *Ophthalmia neonatorum* (a common cause of blindness among infants in Europe) is exceedingly rare in Palestine.

> The number of blind beggars about the towns is extraordinary; among the Moslems they occupy a privileged position, being employed to walk in front of funeral processions, chanting the Qur'ān, led by a boy who can see; they also make similar recitations at the graves, being so employed because their condition is supposed to render them safe companions to the women-mourners who congregate there. They are prepared carefully for their duties by a shaikh, who ensures that they know the passages of the Qur'ān correctly.
>
> Among all classes these beggars receive a considerable degree of compassion and charity, and they have, in this respect, a better time than many equally poor who suffer from other diseases—except, perhaps, lepers.

The prevalent Ophthalmia of Palestine is ascribed by the natives to figs or prickly pears (cactus), and by Europeans to dust, flies, dirty water, etc. Until recent years Egyptian (and Palestinian) ophthalmia (acute muco-purulent conjunctivitis) was supposed to be something *sui generis*, but recent investigation has shown that this disease is due to the same specific germs as the ophthalmia of Europe. Four bacilli have been identified as commonly occurring—the *gonococcus*, the *pneumococcus*, the *Morax-Axenfeld*, and the *Koch-Weeks* bacillus. The first two are answerable for a considerable proportion of the most severe cases, in which the cornea becomes ulcerated and the whole eye sometimes becomes destroyed in a few hours. The Koch-Weeks bacillus is the special cause of the great exacerbation of ophthalmia (66 per cent. of all cases, Butler) which occurs annually in July and October. Although the epidemic is in these months, the severest cases often occur later, in November or even December. Closely associated with this acute ophthalmia, though probably an entirely distinct disease, is the widely prevalent trachoma, or "granular lids." This is the chief cause of defective sight and chronic filthy eyes; it appears to be a disease for which the Semitic races have a special proclivity. Like the ophthalmia mentioned above, it is, in its early stages, highly infectious, and it is the commonest thing to find every member of a numerous family suffering from this unsightly complaint. The disease frequently begins insidiously, and is hardly noticed until a thickening of the upper lid, giving the appearance of the eye being half closed, and a smarting of the lids calls attention to it. In severe cases the whole of the conjunctiva lining the eyelids is found to be covered with "granulations" varying in size from a pin's head to a hemp seed or even larger. The "granulations," when neglected, are disastrous to the eye. In time they produce (directly or indirectly) "pannus," a kind of opaque growth over the cornea and—more serious still—these inflammatory growths commence, after a time, to cicatrize, and in so doing cause the eyelashes to become turned inwards towards the eye (*trichiasis*). These inverted eyelashes, by constantly playing up and down against the already irritated cornea, set up chronic inflammation, causing it to lose its transparency and leading gradually to diminishing sight and eventual blindness. The proportion of people with defective sight is enormous, and in many districts it is the exception to find a person with two really sound eyes. Among the middle-aged most eyes will be found to

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have upon their corneae white patches (*leucomata*) (the cicatrices of old ulcers), or a general loss of transparency due to *trachoma*, or to be suffering from a chronic discharge of muco-pus from the eyelids. Flies, though not the real cause of these diseases, without doubt act as carriers of infection from the diseased eyes to the sound, and this is more easily done because the afflicted, especially the young children, do not seem to mind the dozens of flies which collect upon their discharging lids. Loss of sight, which to us seems such a terrible affliction, in the East is taken with extraordinarily stoical impassiveness. One old Moslem, for example, who had travelled far to seek the advice of a British practitioner, when told that nothing could be done, merely exclaimed "*el hamd el'illah*" ("the praise to God!").

Sunstroke, especially among children, is by no means uncommon. Many Europeans get mild attacks from the heat in the Ghor.

Serpent's bites are fairly frequent, and in the Jordan Valley not seldom fatal; the majority of the snakes in the land, however, are harmless. Scorpions abound, but their stings, though painful, are not usually dangerous; a weakly child may die from one unusually severe.

Various forms of Idiocy and Insanity are by no means uncommon, but suicide is distinctly rare. Idiots and the chronically weak-minded are treated with a certain respect and kindness, their minds being conceived of as engaged elsewhere than on earth. The acutely insane are frequently treated with great harshness—beaten, for example, or chained up in darkness and seclusion—with a view to driving out the supposed demon who causes the affliction.

A word may be added in conclusion regarding Childbirth. The age of marriage is very early in the Orient—twelve or thirteen is no uncommon age for a girl to be married and even to become pregnant. Childbirth among the bedawīn and fellahīn is a very primitive affair, and labour is short and easy; even when the mother is immature, the worst, as a rule, that happens is the death of the infant at birth. In the towns, too, the "uncivilized" Arab women and the Jewesses have easy labours. European doctors are only very exceptionally called in, as the larger towns, where such doctors reside, are also well supplied with skilful midwives. The old obstetric chair, which goes back to the most ancient times, is still in use in Jerusalem, but is now rapidly passing out of fashion. The period of suckling is long—among the Jews commonly two, and among the Moslems even three, years. Considering the hard lives

and often poor fare, it is marvellous how the mothers contrive to suckle for so long, but the babies suffer terribly, and infant mortality is enormous. Abscesses of the breast are common, and if they occur in both breasts early after childbirth, the infant commonly dies. Infantile diarrhoea and dysentery and the results of malaria account for many deaths. It is quite a common thing to meet women who have had a dozen or more children, but who have succeeded in rearing but one or two. Although the parents will display a good deal of spasmodic anxiety over the infant while it is ill, they take its death with philosophic resignation. This is especially the case if the deceased is a female, for girls are not considered a subject of much congratulation, and "May God give you a boy," or "May God give you many sons," are the ordinary good wishes for a married couple. Many a wife who produces an unbroken succession of girls has a bad time of it with her husband and his relations.

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# CHAPTER IV.

## *The Ideas among the Natives of Palestine regarding the Causes and Cure of Disease.*

THE ideas of the modern fellah or bedawī regarding the causes and cure of disease are derived from a number of traditions that have survived from various successive ages. First of all, there is a stratum of folklore belief which is universally respected to-day, but which, from its wide distribution and quaint unreasoning nature, is evidently extremely primitive; then there are beliefs connected in some degree with the orthodox religions, especially with the Kur'ān and the official interpreters of these Scriptures; a later stratum, which accounts for disease on rational grounds, belongs to mediaeval medical lore; while in some parts of the land modern ideas of sanitation and of medical and surgical treatment are slowly coming to be recognized.

Belonging, doubtless, to really primitive beliefs, we have the cult of the Evil eye an influence which is to-day considered by the majority in the land as the most potent of all causes of disease and death. "The eye fell on him and he died," is the way a mother will narrate the death of her firstborn. In the Orient the most dreaded eye is a blue one; the owner of such may, quite innocently, bring misfortune, disease, or death at any time. A look or a word of admiration bestowed, however casually, may prove disastrous unless the owner of the eye checks the influence by muttering the name of God. Children and horses are particularly liable to fall under this curse. It is to avoid the glance of the evil eye that many a child is kept unwashed, or dressed in the shabbiest clothes—often only in garments given by or begged from strangers. For fear of this or of a very similar malignant influence not defined, children will be called by displeasing names, such as "wolf," "jackal," "bear," or "leopard," or given such names as "forsaken." In other cases a child will be allowed to remain unnamed, being addressed as either "boy" or "girl," as the case may be. Sometimes the mother pretends to sell the child to another

woman, who gives her, perhaps, a sum equivalent to a farthing for it. To guard against the evil eye, amulets are worn by most children and by horses. In the latter case, bright blue beads are considered sufficient; but around a child's neck there is frequently a necklace of assorted charms—in some cases a veritable museum. Thus, a large lump of alum is added to the collection because it is a substance irritating to "the eye"; bright coins or beads are employed because they attract "the eye" away from the child's face; the bone of an owl because this bird's keen sight at night invests its bone with peculiar virtue as a guardian; or we find such objects as a hedgehog's hoof, the vertebra of a wolf or dog, or a small dog's tail. Commonly, too, an amulet called a *hajāb*, a small metal or leather case containing an extract from the Kur'ān, or a cabbalistic charm, written by a *ḳāteb*, is worn; in the Jerusalem district it also often contains a piece of the black "stink stone" of Nebi Mûsa. The Oriental Jews also frequently add small metal plates with some Hebrew words, and metal, or other material, moulded into the form of a hand—the "hand of might." Besides the special amulets, the fellahīn adorn a child for whose safety they specially fear with a cap (*tuḳeyeh*) of some bright colour—red, yellow, or green—while the Oriental Jews further ornament such a cap with blue beads, often arranged in a Hebrew device. All these things may be considered as part of the prophylaxis against disease.

When, on account of a child wasting away, it is suspected that the "eye has fallen on him," various magical means are resorted to in order to ascertain who is the guilty owner and to destroy his power. Such a ceremony is called a *raḳweh*. A "wise woman" —the modern survival of the "witch"—is called in; she takes[1] a little barley, salt, alum, *meriamīyeh* (an aromatic plant), and olive leaves, and, placing them together in an earthenware dish over a fire, she allows the fumes to come over the sick patient, while she mutters: "O God! prayer in the name of the Prophet, from every blue eye and from all divided teeth.[2] The Prophet has charmed his female camel and followed his companions. O God! prayer in the name of our Lord Muhammad. Let there be fire in the eye of the

[1] This is the account of one ceremonial—the details vary in different localities and religions.

[2] Divided teeth are a secondary characteristic of the bearer of the evil eye.

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neighbour; let there be a *khisht*[1] in the eye of the maiden; let there be a sword in the eye of the guest; and let there be a *shurshura*[2] in the eye of the woman and in the eyes of all that saw you and made no prayer to the Prophet." The lump of alum by this time has melted in the heat, and the woman exclaims that the crackling sound that it makes means the destruction of the offending eye; while she professes to recognize in its shape, as it hardens, the features of the individual who has bewitched the child. The next step is to destroy his or her influence. To do this it is necessary to secure part of his clothes or other personal property, and to burn it before the afflicted child. Pieces of the straw mat from the room—preferably taken from the four corners—or a fragment of the palm leaf carried on Palm Sunday, may also be burnt as curative fumigators. For this purpose the Oriental Christians cherish these leaves from one Palm Sunday to another.

A child wasting away is sometimes declared to be a changeling, and a "wise woman" recommends various remedies to right matters: for example, letting the child down a well, or burying it up to its neck in a dungheap.

Another common cause of disease, according to native medical lore, is fright. A sleeping person must be very gently and slowly aroused, lest the start of a sudden awakening should cause disease. For one who has undergone a severe shock of any kind, the popular remedy is to make him drink for seven days—a mouthful at sunrise and sunset—from the *tāsat er-ra'beh* (lit. "cup of fear"). This cup must be kept all night in the rays of the moon; no sunlight must fall upon the liquid. The ritual must commence with the appearance of the new moon. The cup is properly made from the vault of the skull of a murdered man, and is lined with silver or copper, and such cups are brought to the villages by the pilgrims from Mecca. But, failing that, a copper cup may be used. Among some of the villagers, an elaborate ceremony is substituted, in which the patient is steamed in a vapour arising from a cooked fowl stuffed with some forty different herbs.

Of the peculiar ideas regarding the causes of special diseases, a few selected examples may be given here. Leprosy is considered to be due to contact with the gecko, which, in consequence, is

[1] *Khisht*, a long splinter of wood used by the fellahīn to close a sack when they have nothing wherewith to sew it up.

[2] A small sickle used for cutting grass.

known as *Abu baras* ("the father of leprosy"). Sore heads (ringworm, etc.) are ascribed to the excrement of bats falling upon them in the dark. Enlarged spleen is often due to swallowing fragments of the finger nails, and this disease—known as *taḥal*—is in turn considered a cause of hernia. Warts are said to be the result of trying to count the stars. Haemorrhoids, or "piles," called *bowāsēr*, are considered as the source of troubles all over the body; for example, a Druze woman under the writer's care asked whether her nasal polypus was not due to *reḥ bowāsēr* (lit. "the breath of piles"). Rheumatism is called *reḥ* (lit. "wind") in the joints. Tetanus, epilepsy, and all forms of lunacy are ascribed to possession by evil spirits. A person must never step across a child lying on the floor, or it will cease to grow; if this has been done by accident, the individual must carefully retrace his steps.

Of the extraordinary number of *remedies* recommended for various diseases, only a few specimens, carefully verified, can be given here. Of the nature of charms we have: the hyoid bone, or canine tooth of a wolf, worn as a sure protection against whooping-cough; a small metal frog, a charm against the "evil eye" in general, is worn particularly against ranula, a cystic swelling beneath the tongue; the fat from the neck of an ostrich is a potent application in rheumatism; a particular rounded red stone, called *bazleh*, is constantly worn suspended from the headdress over the eyebrow of a chronically reddened eye—when the eye gets better, the stone is believed by some to turn white. Red appears to have peculiar healing virtues, because the wearing of a red coral necklace is a remedy against fever, and this, too, is said to become white when it has worked its cure. A calcined calf's foot, powdered and applied in a piece of red material, is a good local remedy for *prolapsus ani*. The urine of a fasting boy, and fasting saliva—a well known remedy—are recommended as cures of ophthalmia. Ear wax is used for ringworm. The hairs taken from the forehead, between the eyes, of a perfectly black donkey, if burnt, are a remedy for eye and other diseases. The hoof of a mule, charred, powdered and mixed with fat is useful in baldness, as is also the gall of an old he-goat. For "shock"—due to a fall or other accident—a remedy much believed in is quickly to kill and skin a sheep and wrap the patient in the smoking hot skin, while the meat is distributed to the poor; for enlarged spleen, goat's dung, dried and dissolved in vinegar, is applied locally; a fever patient may be strengthened if fed on

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camel's milk which has been stirred with the camel's tail until the milk is dark in colour. For barrenness there are, naturally, many remedies, among which may be mentioned the claws of a hoopoe burnt and dissolved in syrup, or a diet of donkey's brains. The eye of an owl enclosed in a piece of the skin of a wolf will drive off poisonous insects, the penis of a fallow deer is a protection against serpents, and boiled Egyptian vulture is thought (by the bedawin of Sinai) to be a remedy for snake-bite. Ointment of crabs is, in some districts, a favourite remedy for lumbago. For this disease it is also considered good to pull up a mandrake from the roots (a feat requiring considerable exertion); when the last fibres give way, the root emits a shriek, but the man who does this will be childless, and so it is a remedy only to be recommended to the old. To cure a "stye" in the eye, some dough must be begged from three Fatmehs or three Miriams, and the eye poulticed with it. For fever, a piece of bread and some bits of candle are taken to the centre of cross roads, a rough enclosure of stones is built over the bread, and the candles are lighted; when a dog comes and knocks over the construction the fever will be cured. Should a woman have a miscarriage or premature delivery, the dead child must be buried below the threshold of the door to prevent the recurrence of such a misfortune.[1]

Belonging to another class are the "charms" made for particular diseases, written by the sheikhs in a decoction of saffron or in ink. The majority of these consist of little more than sentences of the Kur'ān, especially the *fatḥah* (opening sentences), repeated over and over again, the spaces between the sentences being filled up with scrawled Arabic letters with no meaning. In some cases the patient is directed either to wear the charm in the cap (*e.g.*, in a case of headache), or to wash off the ink and drink the liquid, to dissolve the paper and swallow it, or, in yet other instances, to burn the paper and inhale the smoke. Occasionally, the directions are to dissolve one half and drink it, and to fumigate with the other half. One patient was directed to cut his "charm" into strips to put daily one strip into a cup and leave it outside the house that the "dews" of night might fall upon it; he was to drink the water so collected, using a new strip every night for a week, after which he would be cured of his cough. Other charms consist of strings

[1] An account of many more such remedies will be found in the *Q.S.*, 1906, pp. 97–102.

knotted in a particular way, a verse of the Kur'ān being recited as each knot is tied.

The sheikhs are very specially consulted for the exorcism of spirits, for which they profess to have great gifts; they pretend, before the assembled patient's friends, to concentrate the demoniacal power gradually into one limb, say a leg, and then gradually make it leave by a particular toe. There is no question that some hysterical cases are "cured" by psychical influence. There is an elaborate ritual for the exorcism of demons called *indulca*, which is well known among the Spanish Jews of Jerusalem. It is performed by a "witch."

For all diseases the *welys* and other sacred shrines are visited. Vows and sacrifices are made for the recovery of the sick. The plants from such shrines are considered valuable for fumigation of the sick, and the dry earth from the neighbourhood is curative of many diseases (*cf.* Numb. v, 17). Many springs and wells are credited with healing properties. Some, like '*Ain es-Sultān* (Elisha's fountain) at Jericho, are beneficial to all diseases; some are useful for the cure of special diseases. Naturally, the hot springs at Tiberias and at el-Hammeh are much resorted to: that there is a supernatural influence believed to be present is shown by the fact that the name of God must not, so it is taught, be uttered while bathing.

Some shrines, particularly those devoted to *el-Khuder*, are credited with special virtues for the cure of insanity. Here, too, there is plenty of evidence that "cures" of certain functional nervous affections do actually take place.

To a different class of treatment belong the bleedings, cauterizings, and issues which are universally used; they are, no doubt, survivals of the orthodox treatment of a past age. Bleeding is commonly done by barbers for fever, and some of the Syrians are accustomed to be bled every spring—a habit to the omission of which in some special year the writer has frequently heard many ills ascribed. The cautery is a constant and universal remedy. The usual spots chosen are the centre of the cranial vault for headache, between the breasts for cough, over the epigastrium for dyspepsia and enlarged spleen, over the throat for diphtheria, and so on. For other pains, such as lumbago, a number of small cauterizations, in sometimes quite an elaborate pattern, are made; or the part is tattooed. Issues, kept open for years by inserting a pea, are exceedingly common on

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the arm for chronic trachoma; and other issues are made in the neighbourhood of painful joints.

With regard to vegetable remedies, a number of indigenous herbs are credited with curative virtues, but are of quite secondary importance to amulets and the magic of the sheikhs. In the towns a number of old prescriptions are used, by which such substances as pepper, ginger, saffron, honey, and garlic are mingled in varying proportions. More effective than these prescriptions is the method of treatment known as *el-'ushbeh*, which is used for Syphilis. The patient is isolated for forty days in a tent or room, fed on unleavened bread (without salt), honey and raisins, and is made to drink great quantities of a decoction of sarsaparilla, with which he is also steamed. The method is also tried for other diseases which have failed to yield to treatment.

In connection with childbirth there are many customs. The most noticeable is that firmly and universally held in belief by Oriental Jews of the danger threatening mother and child from the malignant influence of Lilith, a female demon about whom there are innumerable tales. To protect against her influences, mother and child must not for a moment be left alone, but be watched night and day, preferably, it would seem, by a noisy crowd of relations and friends; copies of an amulet printed in Hebrew are hung on the bed and about the room; a bunch of garlic, one of rue, a Passover cake shaped like a hand, and some bright blue beads are also commonly hung on the bed. Among the fellahīn the midwife is usually responsible for the child the first forty days of its life. When she cuts the navel cord the infant receives its name and, with boys, in many cases the name of his future bride (the "daughter of So-and-so") is also mentioned, such a betrothal being binding. Hence the proverb "Your navel was not cut in my name" means "I am not bound to do this or that thing." As soon as the navel is cut the midwife rubs the child all over with salt, water, and oil, and tightly swathes it in clothes for seven days; at the end of that time she removes the dirty clothes, washes the child and anoints it, and then wraps it up again for seven days—and so on till the fortieth day (*cf.* Ezek. xvi, 4). Among the bedawīn of Sinai a male child is often made to swallow the ashes of a scorpion mixed with milk, or the finely-chopped feather of the long eared owl; the former is considered to be a protection against scorpion bites; the latter brings luck. Both must be taken before the mother's milk is first tasted.

# CHAPTER V.

*Light on the Conditions of Life and Health in Early Historic Times which may be gathered from the results of recent Archaeological Research.*

THE recent excavation of many ancient sites in Palestine enables us to form a fair, though necessarily an incomplete, conception of the hygienic conditions of ancient times. From the earliest house-dwellers down to at least the "Greek" period, the streets and houses of even the most important towns of Palestine resembled those of its modern villages. The streets were very narrow and crooked, laid down without system, and with no regard to health; the houses were loosely built, with small rooms, mud roofs, and hardened mud floors. The comparatively rapid accumulation of rubbish over these sites from century to century suggests that the streets were kept in a chronic condition of neglect as they are to-day—in summer choked with dust, in winter almost impassable with mud. There is an entire absence of drainage of any sort; the scanty channels which have been laid bare in some sites are all apparently for conducting water from the roofs to the rain-filled cisterns. Most towns were abundantly supplied with cisterns, even those which had good natural sources of water in the neighbourhood. It is a revelation of what the water from these cisterns must have been like when we find how frequently they contained, while still in use, bodies of animals and human beings. Under such general conditions a degree of health is possible only when life is lived in the open, outside the inhabited area. The presence, however, of great walls, with few and well-guarded gates, suggests that not infrequently the whole population must have been cooped up in a very narrow area entirely unprovided with sanitary conveniences—a condition disastrous to health.

In the very earliest periods interments within the walls—in caves—were common, but later it was exceptional, and then chiefly in connexion with religious ritual, *e.g.*, foundation sacrifices. While caves and rock-cut tombs were used at all periods for the more important individuals, the common people were probably buried in the earth. At a very early period cremation would seem to have

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been customary in some parts of Palestine—*e.g.*, Gezer—but it was afterwards abandoned. It is evident, from the large proportion of young children's bones found in the tombs, that infant mortality was high, while there also appears to be but a small proportion of senile skeletons. The mean age at death was low.

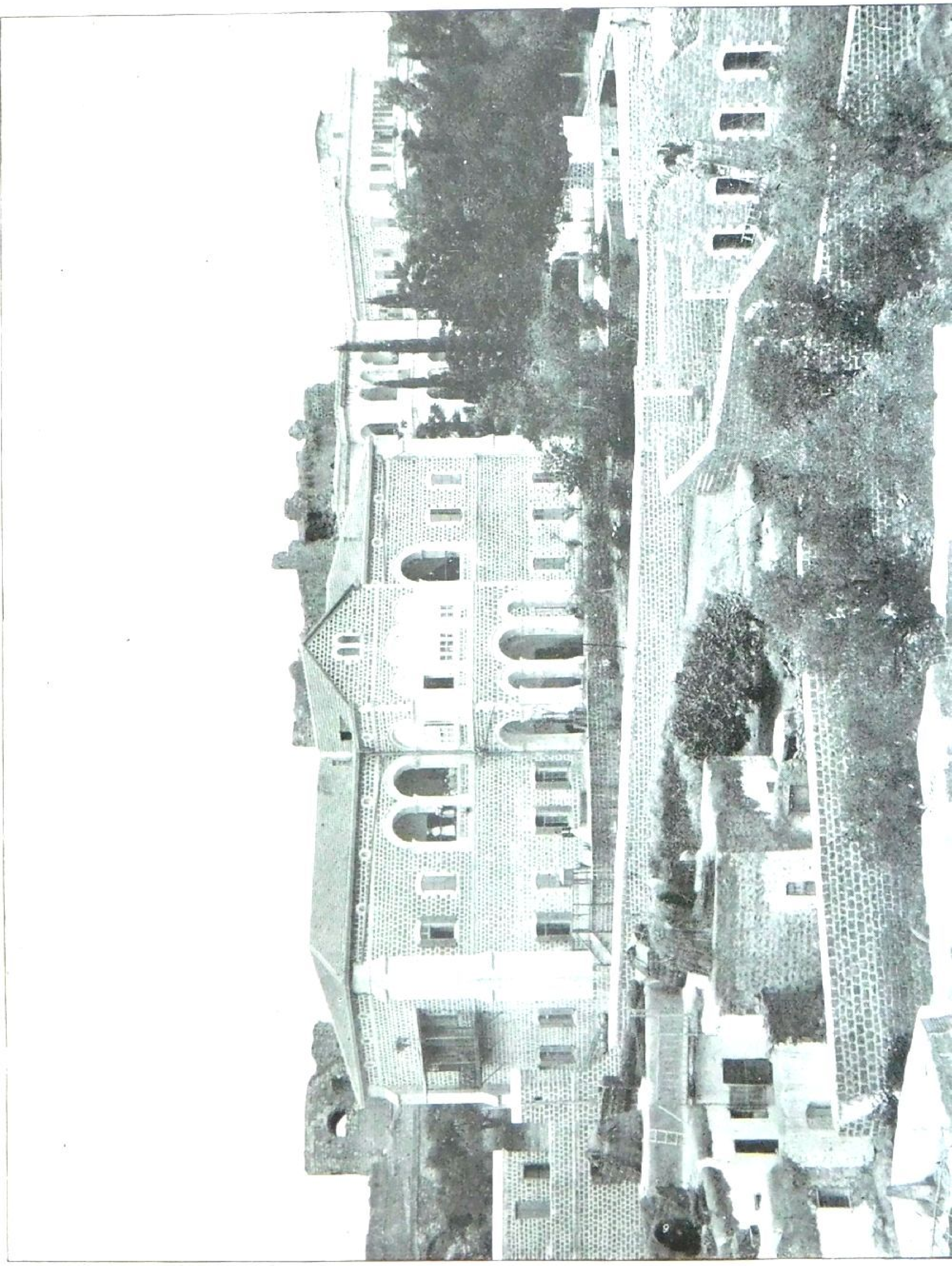
With respect to disease, we may surmise that enteric and typhus fevers (not distinguished from each other by early medical writers, though well known) were common, for under such surroundings as those described they must have flourished. The great number of open cisterns would furnish conditions favourable to the multiplication of mosquitoes and the propagation of malaria. As this disease appears to have become very general in Greece in the fifth century B.C. and to have travelled to that land from the East, it was probably established in Palestine, at any rate in the lowlands traversed by the great trade route from Egypt to Mesopotamia, at a considerably earlier date.

We know from the recent examination of Egyptian mummies that tubercular disease of the lung occurred in very ancient times, and it is fairly certain that it was present in Palestine in at least all the historic ages. The human remains found in Gezer show that the teeth were fairly sound at the earliest periods, as the food was then probably coarse and simple, as among the modern fellahīn, whose teeth are also good, but dental caries became very prevalent under the more luxurious life of the centuries just before Christ. Tubercular bone lesions and chronic rheumatoid arthritis appear to have been fairly common at all periods; skeletons have been found with very advanced pathological changes. The bone lesions very suggestive of syphilis are also found before the Christian era.

In this connexion it may be worth while to notice the preponderating interest displayed by religious ritual in the functions of generation, as is witnessed by the numerous small phallic images and the Astarte plaques. The great number of amulets found at all periods show that the people trusted in them at least as much then as now for the prevention and cure of disease.

Many of the ancient pottery vessels are supplied with strainers, possibly constructed to keep leeches from passing into the mouth with the drinking water.

To face p. 32.



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# PART II.

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# PART II.

# DISEASES OF THE BIBLE.

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## CHAPTER VI.

### *Hygiene in the Old Testament.*

On this subject we have little information except what can be gathered from the Pentateuch. That the ceremonial laws of the Old Testament tended as a whole towards health cannot be disputed, but this was not their primary object, and they can only in a very minor degree be looked upon as laws of health. A few examples from the Levitical laws will be sufficient to emphasize this point.

With regard to the *dietetic laws* of the Pentateuch it is clear that their object is mainly "religious." The abstinence from blood, for which a reason is given in Levit. xvii, 14, R.V., "for the life of all flesh is the blood thereof," and from the eating of certain animals, is rather the observance of certain long-established "taboos," than the following of any hygienic provision. Blood was too "sacred" (cf. 1 Sam. xiv, 32–34) and, like the fat, belonged by long usage to the altar or the priest; if not so used it had to be destroyed. The elaborate ritual regulations by which the orthodox Jew tries to get rid (as he supposes) of *all* blood, only succeed in making the meat indigestible and deficient in nourishment. Microbes of disease occur in fewer numbers in the blood than in any tissue of the body. With respect to some of the "unclean" animals, the "taboo" origin of their exclusion from ordinary use as food is evident. The camel, for example, as is well known, was a sacred animal among the early Semites (see W. Robertson Smith's *Religion of the Semites*) and its meat was only permitted as food on certain festal occasions; though not eaten to-day by the Arabs ordinarily, a camel which has met with an accident is not uncommonly killed by cutting its throat to let out the blood, and is then cut up for food; the meat is not



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unwholesome. The coney (*Hyrax syriacus*) is a clean vegetable-eating animal whose flesh is quite edible; it does not really "chew the cud" (cf. Deut. xiv, 7) though, like the hare, it moves its jaw in a way suggestive of that process. The hare (*id.*), as is well known, is wholesome and is much esteemed by the Arabs; it was "taboo" among the Hebrews.

The argument that the pig was wisely forbidden because of the frequent presence of tape worm (*Taenia solium*) is invalidated by the fact that the equally disagreeable *Taenia saginata*, derived from beef, is extremely common in the East, and even in Europe is a much more prevalent parasite than *Taenia solium*. With respect to that much more serious disease *trichinelliasis* (trichinosis), which results from eating pork infected with the minute encysted worm-parasite, *Trichinella spiralis*, there is every reason for thinking that the rat and not the pig is the normal host of this parasite, and that it is only in the filthy conditions of mediaeval and modern pigsties that the disease has acquired a habitat in the latter animal (see Allbutt's *System of Medicine*, 2nd ed., Vol. II, p. 912). That the disease was present in the pigs of the East in Old Testament times is highly improbable; it is unlikely, too, that these animals were in early times so inevitably associated with a filthy environment as in later days. It was, in fact, the sacrosanct character of the pig which caused it to be included among the "unclean" animals. We have evidence that the same was the case with the mouse and its near allies (Isa. lxvi, 17). Other factors may have contributed to the making of the list of "unclean animals." The manifestly foul-eating habits of birds like the vulture may have led to their inclusion, or it may be simply because they consumed flesh, this being "sacred." The scaleless fish, such as the eel and the wholesome and appetizing sheat or catfish (*Clarias macracanthus*) of the Jordan lakes, may have been forbidden originally on account of their serpent-like form. The well-known regulation against "seething a kid in its mother's milk" (Exod. xxiii, 19; xxxiv, 26; Deut. xiv, 21), concerning which the Talmudists have evolved so many casuistic regulations of diet, is clearly a law against partaking of the well-known and not unwholesome dish *lebban ummho* (lit. "the milk of his mother"), which is prepared by the Arabs by cooking a newly-born kid in *lebban* or sour milk; it is a special delicacy and is commonly prepared as a peculiar mark of hospitality for a visitor. Although the real reason for this food having been so stringently forbidden is

now lost, it must be looked for rather on ritual grounds—possibly in connection with idolatrous feasts—than for any sanitary purpose. The Rabbinical instruction given to the modern Jewish *schochet* (slaughterer), though undoubtedly of value as ensuring the condemnation of some of the grosser forms of tuberculosis, stops short of any scientific exactitude by overlooking—in modern Palestine at any rate—much "measley beef." The regulation (Levit. xix, 23) against "uncircumcized fruit"—difficult to understand in any case—is clearly a "religious" rather than hygienic law. The regulations of Deut. xxiii, 10–15, may originally have arisen from a superstitious fear that some injury might be done to the owner of the excreta, but later on they became for all practical purposes actual sanitary regulations; how necessary these were is seen by the condition of things in modern Palestine (see Chapter I). The rough and ready proof of virginity (Deut. xxii, 15–20) survives to-day amongst the bedawīn where the bloodstained cloth is hung prominently in front of the tent after the consummation of a marriage. The regulation (Deut. xxii, 8) regarding the building of a balustrade around the edge of a roof was a wise precaution; the present writer has seen many severe and even fatal accidents in consequence of the habitual neglect of this custom among the fellahīn.

There are a number of regulations in the Pentateuch regarding the purification of individuals which, though "religious" in their inception, are in some cases of hygienic value. Thus, the isolation of a woman during the puerperium must have been of sanitary use, though the much longer time prescribed after the birth of a female (fourteen instead of seven days, and sixty-six instead of thirty-three, Levit. xii, 2–5) is fanciful and unscientific. In the same way some basis of scientific truth may remain in the rules regarding menstruation (Levit. xv, 19–23), but they are carried to an extreme quite unnecessary for health (*e.g.*, verses 22, 23) and the period of seven days is one usually in excess of necessity. In practice, it has unfortunately led to the exclusion of the oriental woman—up to the menopause—from public worship in the synagogues and the mosques. Levit. xv, 2–15, would seem to refer to gonorrhoea or some such disease, and the rules have undoubtedly a hygienic tendency, but the regulations in the following verses (spermatorrhoeal and concubital uncleanliness) are purely ceremonial. That contact with the dead (Numb. xix, 11) may in some instances be a cause of infection gives the laws of Levit. xxi, 1-3, 11, and Numb. xix, 5, a sanitary value,



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but that merely ceremonial and not literal cleansing is the intention may be seen from Numb. xix, 18, where the "cleansing" consists of sprinkling a few drops of water by means of a bunch of hyssop over tent, vessels, and persons. The same may be said of the isolation of those suffering from the various skin complaints—some of which *may* have been really contagious—included under the name *zara'ath* ("leprosy"). Circumcision, both among the Hebrews and many Gentile races by whom it is practised, is primarily a "religious" institution, and no consideration of any physical benefit appears to have favoured its institution or its continuance. It is true that the removal of the foreskin may in some individuals, especially the uncleanly, prevent the occurrence of such conditions as *phimosis*, *balanitis* and *paraphimosis*, but in the writer's experience circumcized babies and young boys, among the Oriental Jews, are very liable to suffer from a form of ulceration of the external *meatus urinarus*, due to the entry of dirt consequent upon the absence of the natural protection of that passage. This small operation, too, as performed even to-day by the special Jewish official—the *mohel*—is by no means unattended with danger. The writer has seen violent "secondary hemorrhage," septic ulceration, and acute erysipelas follow it. There is no scientific evidence for the assertion that the rite is a protection against venereal disease, or that it is in any sense conducive to continence. On the physical plane, circumcision is a mutilation of nature's provision.

As a whole there can be no question but that these laws, by inculcating temperate and moral habits, by encouraging labour six days a week only, and by their great annual feasts which involved a thorough cleansing of the house, healthful pilgrimages and change of habit, did much to promote the vitality of the Hebrews. The survival and steady increase of this race, in spite of privations and persecutions and of continual loss by religious defection, is abundant proof that even the cumbersome legislation of Talmudic Judaism is on the side of good health and long life. It is, however, the moral and religious teaching rather than the mere ritual laws that has made this people prosperous.

# CHAPTER VII.

## *Disease and Medicine in the Old Testament.*[1]

ONE of the characteristic features in the mention of disease in the Old Testament is its very general character. With few exceptions, and those mostly of kings, disease in the individual is not mentioned; it is disease as the punishment of a community which calls for mention. Again, almost all such diseases are mentioned in a very indefinite way; it is hardly possible to come to exact conclusions regarding any of them; what has been written on the subject has been largely speculative. When we consider (see Chapter III) the universal prevalence of fevers of various kinds in Palestine, it is not surprising that several words occur in the Hebrew to describe them. Thus in Levit. xxvi, 16; Deut. xxviii, 22, we have קַדַּחַת, *kaddaḥath* (LXX. *πυρετός*), tr., A.V., in Levit., "burning ague"; in Deut. xxviii, 22, דַּלֶּקֶת, *dalleḳeth* (LXX, *ῥῖγος*, *i.e.*, "intermittent fever"), lit. "burning," probably some fever or inflammation; and in the same verse חַרְחֻר, *ḥarḥur* (LXX, *ἐρεθισμός*)—a word occurring nowhere else—tr., R.V., "fiery heat" and supposed by some to be erysipelas. Although the association of these three words in one verse implies that they represent either different specific fevers or stages of fever, yet we cannot be sure which of them to apply to the common fevers of Palestine and Syria—malaria, enteric, typhus, pneumonia, etc. Associated with the above in Levit. xxvi, 16; Deut. xxviii, 22, is שַׁחֶפֶת, *shaḥḥepheth*, the essential meaning of which is "becoming thin" or "wasted," hence it is translated "consumption." There is no reason why it might not be real tubercular phthisis which we know to have been a very ancient disease, tubercle bacilli having been detected in early Egyptian mummies, but it may include other diseases producing rapid wasting, *e.g.*, diabetes and cancer. כִּלָּיוֹן, *killāyōn* [Isa. x, 22, tr.

[1] It must be pointed out that the root-meanings of the Hebrew words mentioned in this chapter are sometimes only conjectural.

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" consumption," Deut. xxviii, 65, tr. "failing" (of the eyes)], probably refers to no specific disease.

Much more impressive to the popular imagination than the fevers, which attacked merely individuals, or at most a few, were the great epidemics of pestilence. Many are the references to such occurrences, and several rather general Hebrew words of similar meaning are used to describe them. (1) דֶּבֶר, *déber*, lit. a "driving" or "snatching away" (cf. Arab. دبر, "death"), Levit. xxvi, 25; 1 Kings viii, 37, tr. "pestilence," Deut. xxviii, 21, with the article, tr., R.V., "the pestilence." In Exod. ix, 3, it is used for the cattle plague. In the plural it is used to signify different kinds of death. (2) מַגֵּפָה, *maggefāh*, lit. "a smiting." It is used (Exod. ix, 15) of the "plagues" of Egypt; in Numb. xiv, 37, of the "plague" from which the spies died; in Numb. xxv, 8, 9, 18; xxvi; xxxi, 16, of the "plague" which is said to have slain 24,000 in the wilderness of Baal-peor; in 1 Chron. xxi, 12, of the "plague" which followed David's numbering of the people; and in 2 Chron. xxi, 14, of the "plague" threatened on account of the sins of Jehoram. See also Psalm cvi, 29, 30; Zech. xiv, 12. It is also used of slaughter in battle, in 1 Sam. iv, 17. (3) נֶגֶף, *négef*, from the same root as (2), (Exod. xii, 13) used of the death of the firstborn in Egypt: "there shall no *plague* be on you." (4) נֶגַע, *nega'*, lit. a "blow," tr. "plague" in referring to the death of the firstborn in Egypt (Exod. xi, 1); also (Levit. xiii, 3) "plague" in the skin, meaning a spot of eruption; (Levit. xiii, 47) a "plague" spot in garments and walls. (5) מַכָּה, *makkāh*, a "smiting," tr. "plague" (Numb. xi, 33) referring to the disease which followed the eating of the quails; 1 Sam. iv, 8 (of the Egyptian plagues). (6) קֶטֶב, *ketęb*, lit. a "cutting off" (cf. Arab. قَطَب, to "cut off," "destroy"), tr. "destruction" (Deut. xxxii, 24, Psalm xci, 6), refers to some kind of "plague."

All these words are used in a general sense and not limited respectively to special diseases; any epidemic disease, sudden in onset and rapidly fatal, might be so described. Any one of them might adequately be used for cholera, bubonic plague, small-pox, or such like. Of the outbreaks of epidemics in the Old Testament, the accounts are too meagre to give any certain opinion regarding their nature. Regarding the "plague" of boils, *shehin* (Exod. ix, 1 ff.)—one of the "ten plagues"—varied opinions have been put

forth. According to Dr. Creighton (*Ency. Bibl.*, article "Boil"), it was bubonic plague; according to Prof. Macalister (Hastings, *Dict. Bibl.*, article "Medicine") it was small-pox, the "blains," אֲבַעְבֻּעֹת (LXX., φλυκτίδες), being explained by Talmudic writers as "pustules," and an epidemic accompanied by "boils" and "pustules," being probably small-pox; on the other hand, other writers, laying stress on the fact that this epidemic was preceded by a great "murrain" of cattle, which was probably "splenic fever" (anthrax), consider that the human plague was also an outbreak of anthrax. On every ground this is improbable. This difference of opinion is typical of the whole subject of disease in the Old Testament. The outbreak of disease following the eating of the quails (Numb. xi, 33) may have been due to some morbid condition of the quail-flesh itself—perhaps to the development of *ptomaines* setting up an acute *enteritis*—or it may have been cholera. The sudden death of the spies (Numb. xiv, 37), the plague which followed Korah's rebellion (Numb. xvi, 45–50), and that which occurred at Baal-peor (Numb. xxv, 8, 9, 18; Psalm cvi, 28–30), were events of terrifying suddenness and awful destructiveness which impressed themselves deeply on the history of Israel; but the accounts mention no symptoms. The only diseases we know of, which spread with such rapidity and with such fearful mortality, are the two modern terrors of the Orient—bubonic plague and cholera. With regard to the former there does appear to be a reference to it in 1 Sam. v, 6–12. The word עֳפָלִים, *'ophālim*, tr. "emerods" (*i.e.*, haemorrhoids), is much better translated here and in Deut. xxviii, 27, by "tumours," and in both passages it very probably refers to the "buboes" or enlarged lymphatic glands which are the characteristic feature of "bubonic plague." These "buboes" may occur in the groin, in the arm-pit, neck, or elsewhere. In the case of the Philistines, it is clear that "tumours" were the characteristic thing about their complaint; they sent five golden images of these tumours, and five golden "mice," as a trespass offering along with the returned Ark (1 Sam. vi, 5). The "mice" are said to have "defiled the land," and it is a suggestive thing in this connexion to notice that epidemics of bubonic plague are often preceded by a great mortality among rats. The defiling of the land may mean that great numbers of rats, field mice, or allied animals had died simultaneously with the outbreak of the plague among the Philistines, and for this reason

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images of them, together with the tumours, were fashioned in gold. The Heb. עַכְבָּר, *'akbār*, translated here "mice," included several kinds of burrowing animals (the root-meaning being "to burrow") and, in the Talmud at any rate, included the rat (see article "Mouse" in *Jewish Encyclopaedia*). It is further consistent with what we know of bubonic plague that the infection, apparently at any rate, accompanied the Ark and the other things sent from the infected area, so that immediately after their arrival at Beth-Shemesh a severe and fatal epidemic broke out there.

If this was bubonic plague, as seems fairly certain, an important point to be noticed is that then some at least of the other outbreaks of plague recorded in the history of Israel, were without doubt of the same nature. Of the epidemic which followed David's numbering of the people (2 Sam. xxiv, 13; 1 Chron. xxi, 22), Josephus (*Ant.*, vii, xiii, 3) gives his own details, founded perhaps on some tradition current among his own contemporaries, but the account is too fanciful for any practical use. The strange destruction of Sennacherib's host (2 Kings xix, 35) would appear to have been due to the outbreak of some epidemic, and it has been supposed that the synchronous illness of Hezekiah, in the course of which he had a "boil" (Isa. xxxviii), may have been bubonic plague due to the same epidemic. This is improbable and unnecessary. Hezekiah's "boil" was probably a severe carbuncle or an abscess. It is not clear from the account given in 2 Chron. xxi, 14, whether the great plague (*maggefah*) refers to some actual epidemic among the people or to a "stroke" of misfortune; the Hebrew would allow of either. The disease from which King Jehoram himself died (2 Chron. xxi, 15, 18) was apparently *dysentery* ending in *membranous colitis*, a disease in which "casts" of the large intestine, often of considerable length, are passed from the rectum from time to time. Even with modern methods of treatment it is a long, and not infrequently fatal, disease. At the time of the siege of Jerusalem, recorded in Jer. xxi, 9, there was a "pestilence" such as often occurs under such circumstances; it may have been *typhus*, which has in the past been known as "jail" or "camp" fever, or *spirillum*, commonly called "famine" or "relapsing" fever; both occur chiefly in times of privation. In Zech. xiv, 12, there is a description of the terrible destruction of the enemies of Jerusalem; their flesh was to fester away (מקק , *mākak*), also their eyes and their tongues. The imagery may have been suggested to the prophet by confluent small-pox.

To skin diseases there are many references in the Old Testament, particularly under the heading צָרַעַת, *ẓara'ath* (from root צרע, meaning to "strike" or "smite," cf. Arab. صَرَعَ, "to strike"). This has, rather unfortunately, been translated "leprosy." The attempt to recognize in the eruption of *ẓara'ath* (Levit. xiii) the features of modern leprosy (*Elephantiasis graecorum*) is hopeless; the Greek λέπρα used in the LXX, which has suggested the English "leprosy," does not mean this disease but rather, primarily at any rate, the familiar skin disease *psoriasis*. It is impossible to identify as the symptoms of any one disease the variety of somewhat vague and general signs of *ẓara'ath* as given in Leviticus. We are reduced to the necessity of supposing, either that this particular disease has changed its character, or even disappeared altogether, or, as is far more probable, that the signs of it given in the Old Testament belong to a number of skin dieases which ignorance of pathology caused to be classed together. It is necessary in dealing with this subject to emphasize the fact that ceremonial "cleanness" was distinct from cure, and uncleanness was something quite distinct from what we understand by contagiousness; the reasons for ritual "cleanness" and "uncleanness" are lost in the dim obscurity of the early history of the Hebrews, or even of the Semite race. Thus, if the "leprosy cover all the skin of him that hath the plague from the head to the feet . . . the priests . . . shall pronounce him clean" (Levit. xiii, 13). It is not stated "it is not the plague," but for some obscure reason the whole surface of the body being invaded made the man ritually "clean." Probably the *ẓara'ath* of Gehazi (2 Kings v, 27) was of this nature. The Talmudic writers do not help as much as might be expected, but they state that *ẓara'ath* refers to any disease with cutaneous eruption or sores, and, indeed, some of the references appear to demonstrate that these writers considered the disease non-contagious. The extraordinarily exaggerated ideas of the danger of infection from lepers which were entertained in the Middle Ages, indeed down to recent times, were founded on the ideas: (1) that the "leprosy" of modern times was the *ẓara'ath* of the Old Testament, and (2) that the *ẓara'ath* was an intensely contagious disease requiring the most rigid isolation. The first proposition is generally discredited, and the second is more than doubtful. In addition to this, modern medicine teaches that leprosy (*Elephantiasis graecorum*) is not hereditary, and only in

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a very mild degree contagious; workers among lepers—medical men, nurses, etc.—run practically no risk if they take the most perfunctory precautions.

Of the words used to denote the signs and symptoms of *zara'ath* the following may be noted:—(1) שְׂאֵת, *s'eth* (LXX, *οὐλή*, a "scar" or "cicatrice"), Levit. xiii, 2. The root-meaning of the word is a "lifting up" or "rising," hence, perhaps, a "pimple" or "boil." (2) סַפַּחַת, *sappahath* (LXX, *σημασία*, lit. a "signal"), Levit. xiii, 2, a "scab," root-meaning uncertain. (3) בַּהֶרֶת, *bahereth* (LXX, *τηλαύγημα*, lit. "brightness"), Levit. xiii, 2, 39. Root-meaning is "to be bright," "to be white"—possibly with the idea of burning, more probably simply "white spots." (4) מִחְיַת־בָּשָׂר־חַי, *mīhyath-basar-hai* (Levit. xiii, 10), may be naturally translated "quick raw flesh." It is probably the equivalent of "granulation tissue," popularly called "proud flesh." If a "white rising" (*s'eth lebhanāh*) or a "bright spot" (*bahereth lebhanāh*) appears upon the scar of a boil (*shehīn*) the patient was declared to be "unclean," *v.* 3. This is somewhat suggestive of the breaking down of a tuberculous sinus, temporarily healed. "Plague upon the head or beard" (Levit. xiii, 30) is called נֶתֶק, *nethek* (LXX, *θραῦσμα*), lit. "fragment" or "piece," from a root-meaning to "tear away," "drag up by the roots." This would appear to be a term including the various forms of ringworm (*tinea*, *favus*, *alopecia*, etc.). בֹּהַק, *bōhak* (LXX, *ἀλφός*), Levit. xiii, 13, a whitish skin eruption, root-meaning "to be white," "to shine," corresponds with the Arab. بهق, *bohak*, which is used to-day with the same meaning. Both the Hebrew and Arabic words indicate the disease *leucoderma* (also called *vitelgo* or "white leprosy")—a disease in which whitish patches, with convex outlines, appear on various parts of the body, usually more or less symmetrically, and gradually spread. The skin in the neighbourhood of the light patches is pigmented a deeper shade than normal. The disease is incurable, but when the patches are universal, as in a few rare cases happens, the patient may, in a sense, be considered cured, the skin being startlingly white. Among dark peoples this gives a very strange appearance; it is a disease specially common in the Tropics among negroes. The cause is unknown.

Other skin affections are:—חֶרֶס, *heres* (LXX, *κνήφη*), from

root-meaning to be "rough" or "scabby;" tr., Deut. xxviii, 27, "the itch." More probably it refers to some other irritating eruption such as *eczema* or *lichen planus*; יַלֶּפֶת, *yallepheth* (LXX, λειχήν), root-meaning to "cling to," hence tr. "scabbed" (Levit. xxi, 20; xxii, 22); יַבֶּלֶת, *yabbeleth*, (LXX, *μυρμηκιῶντα*), Levit. xxii, 22, A.V. tr. "having a wen" (Jewish tradition, "having warts"), R.V. marg., "having sores." The root-meaning is to "flow" or "run" and, therefore, having an "ulcer" or "running sore" would be a better rendering; גָּרָב, *gārābh* (LXX, *ψώρα ἀγρία*, *i.e.*, "scabies"), tr. (Deut. xxviii, 27) "scurvy." As جَرَب (*jarab*), the Arab. equivalent, is the regular word for "the itch" (*scabies*), it is probable that *gārābh* is the same. *Scabies* is due to the presence in the skin of the parasitic mite *Sarcoptes scabei*, and in Palestine, it is a common and very intractable disease among the poor and uncleanly.

Regarding the disease with which Job was smitten—"sore boils (*shehīn*) from the sole of his foot unto his crown" (Job ii, 7); his "flesh clothed with worms (? maggots) and clods of dust" (vii, 5)—there have been various speculations. The type of disease in the writer's mind may have been true leprosy (*Elephantiasis graecorum*), small-pox (*variola*) or, perhaps most probably, a very extensive *erythema*. Highly improbable is the suggestion "Oriental sore," which is commonly a single lesion and never a general eruption. The same may be said of malignant pustule (*anthrax*) and Guinea worm (*Filaria medinensis*).

A number of diseases and deaths are recorded in the Old Testament as due to disease of the Central nervous system. The *insanity* (שִׁגָּעוֹן, *shigga'on*) of Saul was recurrent and was attended with attacks of homicidal and suicidal mania (1 Sam. xviii, 11; xx, 33), and of melancholia (1 Sam. xvi, 14–16). No doubt it was David's contact with Saul during these real paroxysms which enabled him so successfully to feign the same disease before Achish, king of Gath (1 Sam. xxi, 13), in order that he might receive that protection which is, in the Orient, accorded to such persons from superstitious reasons. Another instance of insanity is that narrated in Dan. iv, 33, where Nebuchadnezzar had the delusion that he was an animal, a form of mental disease known as *lycanthropy*.

The death of Nabal (1 Sam. xxv, 37, 38) where it is recorded that "he became as a stone" after a period of mental excitement

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and drunkenness) would appear to have been due to *apoplexy* following cerebral haemorrhage. In 1 Macc. ix, 55, there is a more marked case of this disease when Alcimus' "mouth was stopped and he was taken with palsy, so that he could no more speak anything." This is cerebral haemorrhage accompanied by *aphasia* due to pressure on the "speech centre." A form of *hemiplegia* appears to have been in the mind of the prophet (Zech. xi, 17) in his words: "His arm shall be clean dried up and his right eye shall be utterly darkened." The sudden death of Uzzah (2 Sam. vi, 7) may also have been due to cerebral haemorrhage, but *syncope* from sudden heart failure caused by over-exertion and excitement seems more probable. A similar death, due to the shock of bad news, is that of the aged Eli (1 Sam. iv, 13–18).

*Insolation* (sunstroke) is incidentally mentioned in Psalm cxxi, 6; Isa. xlix, 10. The death of the Shunammite woman's child (2 Kings iv, 19), who had been exposed to the blazing harvest sun, was of this nature; such incidents are by no means uncommon to-day. An even more striking example of insolation is the death of Manasses, the husband of Judith (Judith viii, 3). Jonah was overcome with the effect of the hot sun and dry sirocco—a dangerous conjunction; *syncope* (Jon. iv, 8) is one of the earlier symptoms of insolation, and the headache which comes on under these conditions may be supposed to be the physical cause of his extreme misery. Such a sudden *drying-up of an arm* as that described in the case of King Jeroboam (1 Kings xiii, 4) might be purely "functional," or if we are to look for a physical cause, the sudden blocking of the main artery of the limb—the axillary artery—might account for it. The disease which affected King Asa's feet in his old age (1 Kings xv, 23; 2 Chron. xvi, 12) has been supposed, by Rabbinical writers, to have been gout. This is an uncommon disease in Palestine, and a more likely suggestion is that it was *senile gangrene*, a by no means uncommon accompaniment of old age in Jerusalem to-day. It is suggestive that the Chronicler says: "yet in his disease he sought not to Jehovah but to the physicians." The reference may be to non-Jewish physicians, users perhaps of incantations in the names of other gods, but it is quite as likely that there is here a veiled reference to the name Asa which means a "healer" or a "physician," and "is perhaps short for אָסְיָהוּ, *i.e.*, 'Yahwé healeth'" (Cheyne, article "Asa," *Ency. Bibl.*).

"Rottenness" (רָקָב, *rāḳābh*) of bones referred to in Prov. xii, 4;

xiv, 30; Hab. iii, 16, etc., is probably *caries*—a disease common to-day in Palestine, and one of the most usual causes of "crookbacktness" of Lev. xxi, 20. The lameness of Mephibosheth in both his feet, consequent upon a fall when five years old (2 Sam. iv, 4), might be due to caries of the bones of the feet, or to a similar disease of the spine, producing pressure paralysis of the lower extremities. The mention that he did not delay to "dress" his feet (2 Sam. xix, 24) might be thought to favour the former, but probably this only refers to washing the feet as a preparation for receiving a guest with due honour.

Broken bones may well be referred to in certain passages where "breach" is used to translate words derived from the root שבר. For example, in Levit. xxiv, 20, a comparison with § 197 in the Code of Hammurabi makes it almost certain that here the "breach" means a "broken" bone. The same interpretation gives a forceable meaning to such passages as Levit. xxi, 19; Exod. xxii, 10 ("hurt" = "get a broken limb"); Isa. xxx, 26; Jer. vi, 14; viii, 11; x, 19; xiv. 17; xxx, 12, 15; and Amos vi, 6 (see Prof. G. B. Gray, *Expos. Times*, XXV, pp. 347 ff.).

Of violent deaths due to injuries, there are many examples: Among the more noticeable:—Goliath struck unconscious by the concussion of a stone on his forehead, and then beheaded (1 Sam. xvii, 50); Abimelech mortally wounded by the fall of a millstone upon him at the gate of the tower of Thebez (Judg. ix, 53); Samson, blinded by the Philistines (Judg. xvi, 21), crushed to death by the house which he caused to fall upon his enemies and himself (*v.* 30). Twice falls from windows led to deaths of royal personages—Ahaziah "fell down through the lattice of his upper chamber that was in Samaria and was sick" (2 Kings i, 2), and Jezebel, thrown from the window of her palace in Jezreel, was crushed beneath the horses of Jehu's chariot (2 Kings ix, 33).

With regard to childbirth, mention is made of the birth of twins (Gen. xxv, 24; xxxviii, 27), the latter a somewhat complicated delivery as the arm first "presenting" belonged to the child born later; the delivery was accompanied by a "ruptured perinaeum" (*v.* 29, R.V.). Rachael died at Ephrath after "hard labour" (Gen. xxxv, 16–18). The wife of Phinehas (1 Sam. iv, 19–22) died after premature labour induced by grief at the death of her husband and her father-in-law. The reference (Gen. xxx, 3) to bearing "upon the knees" is to the custom of a woman in labour leaning across

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the knees of another woman. The birth-stool (Exod. i, 16) is still found in use in the Orient. There are many references to the *pains of labour* (Isa. xiii, 8; xxi, 3; xlii, 14; lxvi, 7; Jer. xxxi, 8; Hosea xiii, 13; Micah v, 3). In Jer. iv, 31, R.V., we read of "the anguish as of her that bringeth forth her first child." There is a detailed reference to labour pains in 2 Esdras xvi, 38. *Barrenness*, in many references (*e.g.*, Gen. xx, 10; xxx, 2), is looked upon as a misfortune, and *miscarriages* as a curse (Hosea ix, 14). In Ezek. xvi, 4, there is a description of a neglected new-born infant from which we can see that the custom of washing, salting and swaddling the infant, which is the rule to-day, is long established.

When we come to *treatment*, it is a surprising thing how little ancient medical folk-lore survives in the books of the Old Testament, that is if we except much of that nature which was incorporated into the regulations dealt with in Chapter VI: in this respect the books of the Old Testament are a contrast to the later Jewish writings which abound in such folk-lore. Jacob's method of obtaining "ringstraked, speckled and spotted cattle" by means of "peeled rods" (Gen. xxx, 37–40), and, in the same chapter (*v.* 14–16), the use of mandrakes ("love apples") as a means of conception, are examples of a whole class. The story of Tobit's blindness is full of medical folk-lore. The blindness was caused by the droppings of a sparrow (ii, 10); it is healed by the gall of a fish (xi, 11), which the son had been instructed by the angel to preserve as useful for anointing "a man that hath whiteness of the eyes." He is informed at the same time that the smoke of the liver and heart of the fish is useful for frightening away a devil or evil spirit. The use by Hezekiah of a "cake of figs" as a poultice for a boil, belongs rather to contemporary orthodox medicine than to folk-lore (2 Kings xx, 7; Isa. xxxviii, 21). The mention of "balm of Gilead" in Jeremiah (viii, 22; xlvi, 11; li, 8) is clearly in connection with healing, but the ointment of Eccles. x, 1, is a perfume and not a medicine.

The physician (רֹפֵא, *rōphe'*, from root meaning to "mend" or "sew together"), mentioned Gen. l, 2; Jer. viii, 22, was primarily a healer of wounds; the apothecary (רַקָּח) is a perfumer (Exod. xxx, 25, 35; Eccles. x, 1). In the days of the Kingdom the prophets appear to have had the monopoly of healing (2 Sam. xii, 14; 1 Kings xiv, 2; xvii, 18; 2 Kings iv, 22; xx, 7, etc.). Elisha's conduct with regard to Naaman (2 Kings v, 10), and Naaman's

expectation of what the prophet would have done (*v.* 11), are examples, no doubt, of the conduct of prophets in this capacity. Priests, too, were to some extent guardians of the public health in enforcing the regulations described in Chapter VI. In later times physicians were employed who treated disease on semi-scientific grounds, some probably Greeks, hence the need for such advice as Eccles. xxxviii, 1–15. In all ages there have been those who consider that to trust to human skill is to slight God. In later ages, Jewish physicians became famous and the interest felt in Physiology and Medicine is demonstrated by the many references to them in the Talmudic writings.

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# CHAPTER VIII.

## *Diseases and Medicine in the New Testament.*

THE diseases in the New Testament need to be treated apart from those of the Old Testament, because the facts recorded about them are different. The information given is much more definite; medical terms used by well-known Greek writers occur, particularly in the works of St. Luke; it is disease of the individual rather than of the community which attracts notice; and, lastly, it is not so much disease, regarded as a judgment of God or simply as the cause of a death which occurs, but it is sickness in relation to the working of the power of Jesus Christ. The healing of disease occurring in the Gospels has, for evident reasons, been the object of searching critical examination by theologians of all schools. No reasonable person who in any degree accepts the historicity of the Gospels—whether the Synoptics or all the four—can dispute that the public ministry of Jesus was attended throughout by works of healing which caused astonishment among His contemporaries. Not only so, but this healing was by no means confined to any special class of cases. Thus, in Matt. iv, 24 (R.V.), we read: "they brought unto Him all that were sick, holden with divers diseases and torments, possessed with demons, and epileptic and palsied, and He healed them," or, put into modern popular medical phraseology, "they brought all the sick to him, people who were suffering from various diseases and painful affections—the insane, the epileptic and the paralysed—and He cured them." We may compare with this the message sent to John (Luke vii, 22, 23): "Go and tell John the things which ye have seen and heard—the blind receive their sight, the lame walk, the lepers are cleansed, the deaf hear, and the dead are raised up." Similar statements to these two occur in Matt. viii, 16, Mark i, 32–34; Luke iv, 40–41; vii, 22. A considerable number of cases of cure receive detailed mention, but there is no indication that the selection is made on account of any striking medical interest. The contrary is the case, for little emphasis is laid on this, the incident being usually given almost entirely to illustrate some special feature of Christ's teaching; the emphasis is always on the spiritual. Thus, certain acts of healing illustrate His opposition to the Pharisaic attitude to the Sabbath (Mark i, 23; iii, 1–5; Luke

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Case of "Jericho Boil."

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xiii, 10–16; xiv, 2; John v, 1–15), His claim to power to forgive sins (Matt. ix, 2–8, etc.), or His attitude to the non-Jewish world (Mark vii, 26–30, etc., and Luke xvii, 16). Others illustrate deficiency of faith on the part of the disciples (Matt. xvii, 15–18), or special faith on the part of the sufferer, as with blind Bartimaeus (Mark x, 46 ff.) and the woman with the issue of blood (Matt. ix, 20 ff., etc.), or striking faith manifested by the sick one's friends (Matt. viii, 5–13; ix, 18; Mark ii, 5). A few of them appear to be introduced largely to explain Christ's movements from place to place (Mark i, 45; v, 17). As mere wonders the miracles of healing are but little emphasized; they are incidental, and the impression conveyed is that the cases mentioned are, as acts of healing, but types of all the others.

An important question is, judging the *history as it stands*, what was the nature of these diseases from the medical point of view? Were they, in any large proportion, of the same class as the neurotic diseases which in modern times furnish such successful results to various classes of quacks and faith healers? In the first place, such cases of neurotic diseases are largely on the increase to-day as a result of the conditions of life in our modern Western civilization; it is not fair, therefore, to argue from these to the environment of the Gospel narratives. In all ages such neurotic diseases must have been commoner in town life and among the more luxurious classes, and, beyond dispute, in the majority of cases they occur in young women and girls. The ministry of Christ, however, appears to have been chiefly in the villages and small towns, among the hard-working and the very poor, and of the reported cases the larger proportion are of the male sex. The writer has seen, during many years in Palestine, many thousand cases of disease among just the same class of people, chiefly Jews, living under very similar social and geographical conditions, and he has never seen "neurotic" or "hysterical" disease produce morbid symptoms comparable with those described in the Gospels. Indeed, most of the cases reported in these narratives are just those which are the despair of the modern medical man. As far as can be judged from the particulars given, the larger proportion of the cases would be considered too hopeless for admission to any of our hospitals, where it is necessary to select from a vast number of the sick those cases only which we have a good hope of curing or of permanently benefiting. Such cases as the imbecile, the paralysed, epileptics,



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the deaf and the blind, would have to be passed over. In many villages in Galilee the writer has been compelled to leave on one side dozens of such unfortunates to deal with the more hopeful cases of fevers, dysentery, ophthalmia, and surgical affections.

Turning now to the examination of the individual disease we find one well-marked case of *epilepsy* (Matt. xvii, 15–18; Mark ix, 15–26; Luke ix, 38–43). The Greek σεληνιάζεται (Matt. xvii, 15) is, literally, "moon-struck," hence the A.V. "lunatic," but the word is the contemporary medical term for epilepsy, and the symptoms are described in such detail that there can be no question as to their genuineness. The centurion's servant, "sick of the palsy, grievously tormented" (Matt. viii, 6 ff.)—St. Luke adds "at the point of death" (Luke vii, 2–10)—appears to have had an *acute myelitis* or a paralysis due to pressure on the spinal cord or brain. A "functional" paralysis would probably have been painless. The man with such a "withered hand" (Mark iii, 1–5) as described would probably be some old and partially recovered *hemiplegia*, in which, after the recovery of the leg the hand is often left wasted, contracted and useless, or a similar condition brought about by *anterior polio-myelitis*, popularly called infantile paralysis. The paralytic, borne of four, who was let down through the roof (Matt. ix, 2–8; Mark ii, 3–12; Luke v, 18–26), was, considering his sex, very improbably a case of hysterical (functional) paralysis. Not one in a thousand of such cases in adult males is anything but organic paralysis.

Of the cases of mental affliction—a very hopeless class of cases in the Orient, and all needing prolonged treatment if any improvement is to occur—we have:—

(1) The man (Mark v, 1–19; Luke viii, 26–36)—or in Matt. viii, 28–32, *two* men,—who ascribed his illness to a legion of demons inside him, as many such people do to-day, and who dwelt in tombs on the east side of the Lake of Galilee. The condition described is not one which any alienist would consider hopeful.

(2) The dumb man possessed of a demon, whose recovery was so startling that "the multitudes marvelled, saying, it was never so seen in Israel" (Matt. ix, 33). Deaf mutes are by no means uncommon in Palestine to-day, and if this man was one of these—who, as far as the writer has seen, never improve in their surroundings in the Orient—the astonishment of the multitudes was natural. This case, however, allows of more than the possibility

that the dumbness was due to emotional causes, and, if so, recovery under the influence of the personality of Jesus is intelligible. Luke xi, 14–15, may refer to this or to the next case.

(3) The man "possessed with a demon"—probably mentally deficient—who was blind and dumb (a condition recalling the well-known Miss Helen Keller), and who was "healed so that the dumb spake and saw" (Matt. xii, 22). Here the choice can only lie between wilful malingering on the part of the patient or a profoundly abnormal and, to science, incurable condition.

(4) The man "with the unclean spirit" healed on the Sabbath day (Mark i, 23). A case of moral depravity due to brain disease.

(5) Somewhat similar to the last was the "unclean spirit" which afflicted the little daughter of the Syro-Phoenician woman (Matt. xv, 22–28; Mark vii, 25–30)—a case apparently of mental depravity bordering on idiocy. In this case it may be noticed that Jesus did not even see the child. The whole group is one which any medical man would undoubtedly consider—judging from the scanty accounts—very unpromising cases for cure, needing at best prolonged and careful treatment.

The case of the twelve-year-old daughter of Jairus, the ruler of the Synagogue (Matt. ix, 18–25; Mark v, 35–42; Luke viii, 49–56), has not been included in this list because, though there is no mention of the nature of the disease, yet it must be admitted that the story, as we read it, would be consistent with the exceedingly rare condition known as *catalepsy*—a condition allied to hysteria—and when Jesus said "She is not dead, but sleepeth," He may have made a perfectly literal statement. The same explanation will not in the least account for the raising of the widow's son at Nain (Luke vii, 11–16), nor of Lazarus at Bethany (John xi, 38–44).

Of the cure of fevers only two specific instances are mentioned: (1) That of Simon's wife's mother (Matt. viii, 14; Mark i, 30), whom Luke the Physician describes as having a "great fever" (Luke iv, 38), *i.e.*, a continuous fever, such as malignant malaria, enteric or typhus. Such disease cannot be charmed away by hypnotism, nor can a patient under normal circumstances rise and minister to people immediately the pyrexia is over (Luke iv, 39). (2) In John iv, 47–54, is an account of how a certain nobleman whose son was sick with fever (verse 52) at Capernaum, received assurance of healing from Jesus at Cana, at the very hour when, as afterwards transpired, "the fever left him."



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Although from various passages it may be gathered that Jesus "healed" many *lepers*, only two incidents of this nature are mentioned, and each for a special reason:—(1) The leper who was instantly cleansed (Matt. viii, 2–3; Mark i, 40–45; Luke v, 12–16—where it says he was "full of leprosy"), and whose unbounded gratitude obliged Jesus to betake Himself to the desert (Mark i, 45). (2) The ten lepers who were cleansed together, of whom one, and he a Samaritan, returned to give thanks (Luke xvii, 11–19). Now though leprosy—unlike the modern disease of that name—was certainly in Bible times a curable disease, and yet, from its external manifestations, a skin eruption, a cure must have been a thing visible to all men, and a recovery had to be testified to by the priest, who alone could allow the patient once again to mingle with his fellow men. No known "mental" influence can cause a skin eruption of this nature to disappear in a few minutes. The woman with the "issue of blood," either *hemorrhoids*, or more probably *uterine hemorrhage*, who had suffered twelve years, and who under the orthodox medical treatment by the physicians of the day had become worse, is described as receiving instant relief on contact with Jesus (Matt. ix, 20–22; Mark v, 25–34). This is not the kind of case which would be likely to be cured by "faith"—in the "faith-healing" sense. In Luke xiv, 2, we have mention of the healing of a case of dropsy (ὑδρωπικός, a medical term), a very definite pathological condition, due usually to cardiac failure or to kidney disease.

With regard to the woman "bowed together" eighteen years (Luke xiii, 10–16) it may, considering the sex, be admitted that it might have been a hysterical case. The writer has, however, never seen such a case due to this cause, whereas such a condition of *kyphosis*, due either to caries of the vertebrae or to chronic rheumatic arthritis, is very common.

The man at the Pool of Bethesda (John v, 2 ff.) had been thirty-eight years "in his infirmity"; the nature of this is not specified, but he was evidently very helpless, lying on a pallet and needing someone to "put him in the Pool." It is difficult to believe that the man, unless a charlatan, which the conditions of the narrative scarcely allow, was not afflicted with some organic disease. The narratives of cure of the blind it is impossible to explain on the "neurotic" theory. Such cases as *hysterical amblyopia* are occasionally met with in which, without any organic change, the sight is for a

longer or shorter period quite absent, so that a knife can be thrust directly towards the eye without the patient blinking. But such cases are exceedingly rare in Europe, and are practically unknown among the less highly strung peoples of Palestine. During upwards of a score of years of medical work in Palestine, during which many hundreds of cases of blindness have passed under the writer's observation, he has never seen a single one of this nature. (For the common causes of blindness in Syria see Chapter III.) It is asking too much to expect anyone to believe that the half-a-dozen special eye cases recorded, not to mention several references to general healing of the blind, were cases of this unusual affection; rare as it is, it is practically confined to the female sex, whereas all the cures mentioned in the Gospels were among men. In Mark viii, 23–25, a blind man is cured at Bethsaida by the application of saliva (a well-known folk-lore remedy for eye-disease); in Matt. ix, 27–30, two blind men are cured by a touch; in Matt. xx, 30–34, two (Mark says "one," x, 48–50) blind men are healed at Jericho, among them the well-known beggar Bartimaeus. In John ix, 1–10, we have the incident of the man "blind from his birth" healed by the application of clay to his eyes, followed by a washing in the Pool of Siloam.

With regard to the *method* used by Jesus in His works of healing, in the great majority of cases a touch from Jesus (*e.g.*, Matt. viii, 3–15; ix, 29), or the touching of His person by the sick one (*e.g.*, Matt. ix, 20; xiv, 36; Mark iii, 10) is described as the source of healing power. Faith in Him on the part of the sufferer (*e.g.*, Matt. ix, 22) or of the sufferer's friends (*e.g.*, Matt. viii, 10; Mark viii, 22; Luke vii, 9) appears to have been to some extent a condition of healing. In the incident of the ruler of the synagogue at Capernaum (Matt. viii, 8; Luke vii, 7), mention is made of the "word" by which healing could be done; this is an idea common in oriental magic, and is closely allied to the Jewish idea of the "Name"—the unutterable Name of God mentioned so often in later Jewish writings (Luke iv, 36) appears to be a reference to the same idea. It is a tradition amongst oriental Jews that Jesus performed all His wonders by his knowledge of the sacred "Name." On three occasions subsidiary means were used. In Mark vii, 34, Jesus cures a deaf man with an impediment in his speech, in the midst of Decapolis. "He took him aside from the multitude and put His fingers into his ears, and he spit, and touched his tongue; and looking up to heaven, He sighed, and said unto him Ephphatha,

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that is, Be opened" (verse 34). In Mark viii, 22-25, a blind man is brought to Jesus at Bethsaida, beyond Jordan; and here again Jesus used saliva, and the cure is remarkable in that it occurs in stages. First, the man sees "men as trees walking," and then, Jesus having laid His hands upon him, he sees plainly. These two acts are unique in the Synoptics, as both occurred in semi-pagan places, and in both Jesus endeavoured to guard against notoriety (Mark vii, 36; viii, 26). Very similar to the second case is the healing of the man born blind (John ix, 6, 7), when clay made of saliva is used, and the cure was also apparently progressive, as the washing in the Pool of Siloam was needed to complete it. No doubt the gestures (cf. 2 Kings v, 11), the saliva, etc., were all intended to strengthen the faith of these special individuals who had not learnt sufficiently of the teaching of Jesus to put their trust in Him unaided.

In the Acts of the Apostles miracles of healing take a subordinate place as compared with the Gospels, but the nature of the diseases treated appears to be similar. It is noticeable that with some, where it is expressly mentioned (*e.g.*, Acts iii, 6; iv, 10), and probably with all (cf. Acts iii, 16) the healing is "in the Name" of Jesus of Nazareth. This is a familiar oriental expression. To-day, a Syrian of any religious persuasion undertakes every important work with a muttered *b'ism Allah*, "in the Name of God," or of Muhammed, or Jesus, or some patriarch or saint. It is the formula for invoking the power of the person mentioned. The miracle of Peter and John at the "Beautiful Gate of the Temple" (Acts iii, 1–10) on the man "lame from his mother's womb" is almost the only one in this book where it is possible to form an opinion as to the nature of the disease. No "neurotic" theory will account for such a man, after having been carried daily and laid at the gate, "walking and leaping" a few minutes later. The record is either worthless as history, or it testifies to a structural change occurring in the lame man's feet. Æneas (Acts ix, 33), a paralytic who had kept his bed eight years, was a hemiplegic or paraplegic, and was healed by Peter "in the Name" of Jesus. The father of Publius (Acts xxviii, 8), is described by the writer of the Acts as having "fever and bloody flux" (πυρετοῖς καὶ δυσεντερίῳ), *i.e.*, either simply acute dysentery, or attacks of intermittent (malarial) fever together with dysentery, a very common combination; the fact that St. Luke uses the plural, "fevers," is in favour of the latter view. The blindness of St. Paul (Acts ix, 8, etc.) was probably a temporary

*amaurosis*, and need not have been accompanied by any actual structural changes; the blindness of the sorcerer Elymas (Acts xiii, 11) was probably of the same nature. There is no known physical change in the eye which would suit these instances. The "often infirmities" (1 Tim. v, 23) for which St. Paul recommended a little wine was probably some dyspeptic trouble for which a little alcohol frequently gives temporary relief. That St. Paul's "thorn in the flesh" was some physical disease there can be little doubt, but, regarding its nature, it is impossible here to give an exhaustive discussion. That it was some form of ophthalmia, such as the *trachoma* so common among the Jews to-day, liable to exacerbations at times, has much to support it. Such a repulsively disfiguring affliction as this comes to be with many, leading not infrequently to-day to the wearing of coloured glasses, as much to hide as to protect the eyes, would necessarily be a great affliction in a public man. The question is fully worked out in Farrar's *Life and Work of St. Paul*, Vol. I, Ex. x. The theory of epilepsy has had even greater support, and is specially developed by Krenkel (*Beiträge*, pp. 47–125), and more recently that of malaria has been ably argued by Ramsay (*St. Paul the Traveller*, V, 2, and other works). The latter view is distinctly better than the former. Severe epilepsy, especially when untreated, usually shortens life, and almost always leads to marked mental deterioration, of which we have no evidence with the great Apostle.

With regard to the death of Herod Agrippa I (Acts xii, 1, 21 ff.) the account of Josephus (XIX, viii, 2) rather implies that he died of intestinal obstruction or *peritonitis*, the latter due, perhaps to *appendicitis*. The tradition that he was "eaten of worms" may have arisen from his vomiting great quantities of intestinal worms, as frequently happens in the Orient under such circumstances. The other cases supposed to be parallel with his are those of Antiochus Epiphanes (2 Macc. ix, 9) who, while suffering from some bowel disease, met with an accident leading to septic wounds which "bred worms," and that of Herod the Great, whose actual cause of death was clearly dropsy, due to cardiac disease (Jos. XVII, vi, 6), and the horror of whose end is deepened by the description that the diseased parts became infected with "worms." Both these cases refer to the by no means uncommon experience in the East, that neglected wounds become infected with maggots which are difficult to destroy.

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# PART III.

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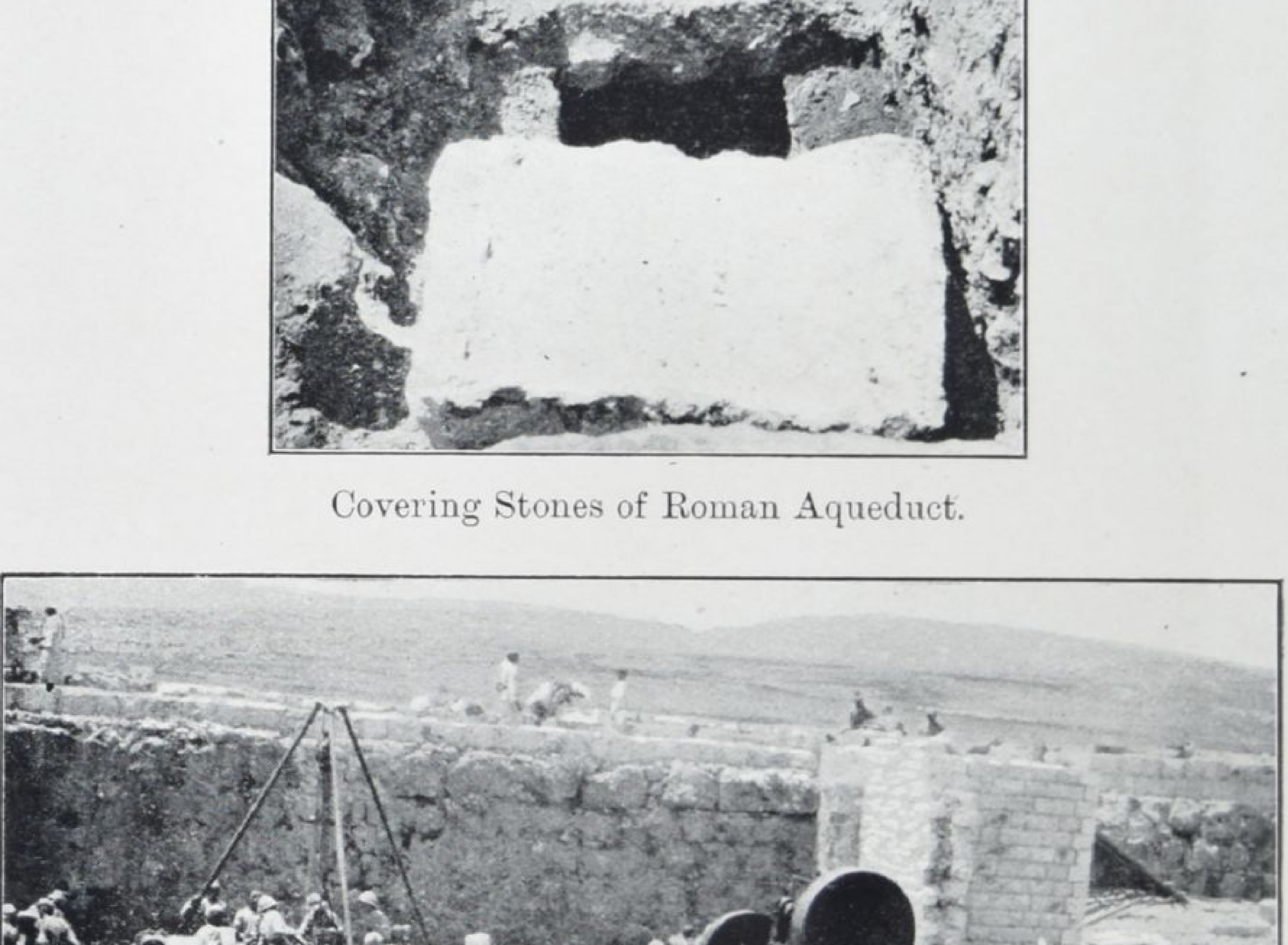
*To face p. 57.*

Covering Stones of Roman Aqueduct.



Birket Arrub with New Pump.

# APPENDIX I.

## *The Water Supply of Jerusalem.*

FROM the time that Jerusalem became a city, the water supply has always been a serious problem. Situated almost upon the water-parting, some 2,400 to 2,500 feet above sea level, in a part of Palestine but poorly furnished with springs, and with a rainfall occurring almost entirely during five winter months, natural conditions contributed but little to the support of a large population. And yet it was the existence of one relatively plentiful spring which, without doubt, drew the first settled inhabitants to this neighbourhood. The first walled town—the ancient Uru-sa-lim—was built just above this source. This spring, now known as 'Ain Umm ed-Deraj ("The Spring of the Steps"), is the Gihon of Old Testament times. Its early importance is emphasized by the great rock-cut tunnels constructed by the primitive inhabitants which gave access to it from within the walls. Judging by the analogy of Gezer, this work is 3,500 to 4,000 years old; it was Joab's knowledge of the existence of this ancient "gutter" (2 Sam. v, 8) which enabled him to capture the city on behalf of King David. The sacredness of Gihon is shown by the fact that here David caused Solomon to be crowned. In the days of the late monarchy, this spring remained of supreme importance to the city; and to protect this precious supply and cut off the waters from the enemy, King Hezekiah made the famous "Siloam Tunnel," 1,700 feet long, whereby he conducted its waters to within the city walls (2 Kings xx, 20), to the pool known in New Testament times as the Pool of Siloam (John ix, 7). The account of the making of the tunnel is recorded in the famous "Siloam inscription"—the earliest Hebrew record inscribed on stone.

Unfortunately, as a result of long centuries of sieges and destruction, this spring now lies so much below the surface of the accumulated *débris* in the valley of the Kedron, that it can only be reached down a steep double flight of thirty steps, and the underlying strata have become defiled so that its waters to-day are brackish and loaded with sewage. During the summer months the supply is intermittent, due, the fellahīn think, to a dragon at the

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underground source; and at such time the quality is worse than usual. If, as is possible, this intermittency existed in New Testament times, it may well have been the origin of the legend of the "troubling of the waters," and here may have lain the "Pool of Bethesda" (John v, 2–4). Even to-day the spring is visited by the sick when the waters are "troubled."

A little further down the valley is a 125-ft. deep well, with a perennial spring at the bottom known as Bir Eyyub (Job's Well), and in the Old Testament as En Rogel. There are many rock passages here, intended to increase the supply, but the water, which is fairly abundant, is like the upper source, contaminated. In the spring, after a very heavy rainfall, the water bursts up, and for a few days runs down the valley as a little stream. The immense appreciation of the Oriental for "living water" is then very apparent, for hundreds of people come out of the city at such a time to sit or wander beside the "flowing Kedron."

Even at their best, when these sources were at least potable, the supply was entirely inadequate for the needs of a capital; and all through the times of the kings, rock cisterns were excavated to store the abundant winter's rain. The largest of these great underground excavations was made in connection with the Temple, in which the sacrificial rites demanded much water for purification.

At a later period—probably, despite popular tradition, not before the coming of the Romans—vast works were undertaken to bring a supply of "living water" into the city. Of these works the most striking monuments are the famous "Low Level" and "High Level" Aqueducts, and the well-known "Solomon's Pools" connected with them. These last are the three great storage reservoirs —named, like all great works of unknown origin in Palestine, as "Solomon's—constructed one above the other across the breadth of the Wady Artas, seven miles south of Jerusalem. The lowest and largest is 582 feet long, 177 feet broad, and 50 feet deep. All these pools are now half-ruined. Originally they were designed to store surplus water from the four springs in the valley, and, perhaps primarily, to catch the flooded waters from the winter rains and pass them from tank to tank for purification.

The low level aqueduct was constructed to convey the water of the four Wady Artas springs, supplemented from the pools, to Jerusalem. It consists of a cemented channel some foot-and-a-half deep, covered with flagstones. The original part is nearly twelve

miles long, and runs from the lowest of the reservoirs, winding along the sides of the hills until it ends at the temple area. The construction of this conduit is so similar to the one which runs from the Wady Artas to the "Frank Mountain"—the ancient Herodium—that we strongly suspect that this, too, was Herod's work. There is further extension southwards of this aqueduct, another 28 miles (five miles directly south of the pools), to tap the abundant springs in the Wady Arrub. Here there is a small ruined storage reservoir, the Birket Arrub, which, after being so out of the way of tourists and others as to be almost unknown to most visitors to the land, has recently sprung into importance in connection with the new water supply. From a passage in Josephus (*Ant.*, XVIII, 3, ii), there is reason to believe that the governor, Pontius Pilate, constructed this section; it is recorded there that he gave offence to the Jews by taking the sacred money of the Temple "to bring a current of water to Jerusalem." This southern extension has long been useless and ruined, but the older section from the pools, through Bethlehem to Jerusalem, has been used, though somewhat intermittently, up till recently. The high level aqueduct took its rise in a chain of 50 wells, connected together by an underground channel—a system known as a kariz—running for four miles along the Wady Biar. The stream which once must have been considerable, then traversed a rock-cut tunnel —1,700 feet long—through a rocky hill to reach the Wady Artas. Here the aqueduct is ruined, and what water runs, immediately after rain, plunges down into the third and lowest pool. Originally the conduit ran along the side of the valley, received an accession to the supply from the 'Ain Sālih, the highest of the springs, and ran on to Jerusalem at a level of 150 feet above that of the low level aqueduct. The high level aqueduct has been almost entirely destroyed, but sections have been found west of Bethlehem, where the conduit was made of great blocks of limestone, pierced and hollowed out into pipes 15 inches in diameter. A long succession of these pipes conducted water across the hollowed plain between Bethlehem and Jerusalem on the principle of an anti-syphon. Upon many of these limestone blocks have been found inscribed the names of Roman centurions of the time of the Emperor Severus (*cir.* 195 A.D.), and so this has generally been accepted as the date of great work. It must be admitted that some authorities consider its original construction to have been earlier, and they assert that

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the names refer to officials who made repairs in a later age. By these ruined aqueducts Jerusalem probably received, it is calculated, as much as a million gallons of water a day at one time.

Belonging to much the same period as these aqueducts are the many open reservoirs which are such a well-known feature of Jerusalem. Of these the "Pool of Hezekiah"—known to the natives as el-Hammam el-Batrak, or the "Bath of the Patriarch"—received a supply of filthy water by means of an aqueduct connected with the "Birket Mamilla" (called in the guide books "Upper Pool of Gihon"). The quality of this water may be imagined when it it is understood that the catchment area from which it runs is a Moslem cemetery in present use. Other such reservoirs are the Birket es-Sultan ("Lower Pool of Gihon") in the valley of Hinnom, the Birket Sitti Miriam outside St. Stephen's Gate, the Birket Israël (now almost filled up), and the traditional "Pool of Bethesda"; both these last are just within the same gate. Near these, under the buildings of the "Sisters of Zion" are the "twin pools," which were fed by an aqueduct from north of the city, now ruined.

As has already been stated, the low level aqueduct remained in use, though wilfully damaged from time to time by the people of Bethlehem, who wanted the water for themselves, until 1901, when a local effort was made by the Jerusalem authorities, with the assistance of a Greek engineer, to "improve" things. As during 1900 there had been a season of drought, spring water was brought by rail in tanks for a time from Bittir, on the Jaffa–Jerusalem Railway; but this temporary measure was replaced a few months later by a system of 4-inch iron pipes running on the surface—up and down hill—from the springs in Wady Artas to Jerusalem. A storage reservoir was made by converting to that use a tunnel through which the ancient aqueduct ran. The water was allowed to accumulate there overnight and to be supplied to the city by day. By these means it is calculated that about 40,000 gallons per day reached Jerusalem. A feeble stream could thus be tapped outside the walls in the valley of Hinnom, and also near one of the entrances to the Haram (Temple area), and the surplus flowed into the Haram cisterns. The public were allowed to fill their "gas tins" at two wayside brass taps for a nominal charge. It was an improvement of sorts, but a mere makeshift. Years before, on no less than three occasions, offers had come from England to restore, free from all expense, the ancient aqueducts as an act of philanthropy;

and, at one time, the late Sir Charles (then Captain) Wilson actually made a survey, at the expense of the Baroness Burdett-Coutts, for the purpose of carrying out this proposal; but the greed and stupidity of the Turks on each occasion blocked the way. Shortly before the war the subject again came up; and the local authorities had before them two schemes, one to tap the springs in Wady Arrub, and the other to pump up water from the copious fountain "'Ain Farah." At both sources the quality is good, but the Arrub springs were considered to have considerably diminished since the time of Wilson's survey, due partly to the destruction of timber and shrub over the collecting area, but even more to the constant waste going on through the water running along underground rock-cut channels which had ceased to feed the aqueduct. At that time the present writer saw thousands of gallons of good water running to waste along these ancient constructions. The engineers consulted by the Turkish authorities seemed to be quite incapable of dealing with the matter and nothing was done. The great advantage of this source lay, not only in its excellence and abundance, but in the fact that the springs lay over 200 feet above the level of the greater part of Jerusalem, so that a minimum of pumping would have been necessary. The 'Ain Farah scheme, on the other hand, would have necessitated pumping the water up over 2,000 feet. However, like so many schemes in Turkey, this also ended in talk. The inhabitants of Jerusalem had to continue to depend upon rain-filled cisterns, which, in most cases, were seldom cleaned and were frequently very foul. The house cisterns, too, were the greatest cause of the prevalent malaria, as they were the breeding-places of countless millions of malaria-carrying mosquitoes. Some depended upon the foul, sewage-contaminated water of 'Ain ed-Daraj or Bir Eyyub, or other water, equally doubtful, carried about in goatskins, and sold in the streets.

When, therefore, General Allenby's victorious army entered the Holy City, the question of a better water supply, both for the army and for the civilian population, became a matter of extreme urgency. The whole of the very moderate piped supply was needed as drinking water for the army, and large quantities of cistern storage was needed for animals. The civilians were left with cistern water of doubtful quality, and the coming dry season might easily have found all reserves exhausted. The condition of the city stricken with malaria and dysentery and, at least just before the

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British entry, with cholera, enteric and typhus, all made the claim for water, pure for drinking and abundant for cleansing, the most urgent of sanitary measures. There was no possibility of improved sewers without water to flush them. It is certain that no measure could possibly have inaugurated the British occupation more auspiciously than a new water supply. So what the Turks failed to do over long centuries, officers of our Royal Engineers carried out within six months. In January, 1918, a preliminary survey was made of the group of springs in the Wady Arrub, which showed that they were yielding 14,000 gallons per hour, and that they would, with careful cleansing, yield considerably more. By February 14th the preliminary investigations were completed, and four days later a provisional scheme to deliver 250,000 gallons per day was adopted by the Engineer-in-Chief. Unsettled weather delayed things at first, but work was commenced on April 12th at Jerusalem, and on the 15th at Birket Arrub, and was pushed ahead with such energy that, on June 18th, the first of the new supply reached Jerusalem.

The new scheme, admittedly a provisional one and capable of extension, has been as follows. The old Birket Arrub (2,723 feet above sea level) was repaired to store four million gallons of water. The ancient rock-cut aqueducts—to the extent of 1,100 metres—which ran to the birket were re-excavated, cleaned and partially reconstructed. A pumping station was erected close to the birket and from the springs—supplemented, if necessary, from the birket—water was pumped to a new reservoir erected at a distance of 3,320 metres at Kilo 19 on the Hebron Road, at a height of 3,083 feet above sea level. This reservoir has a capacity of 300,000 gallons, and from it water can be delivered in Jerusalem by gravity. A second reservoir of 200,000 gallons capacity was constructed west of Jerusalem above the village of Lifta, at a height of 2,788 feet above sea level; higher, that is, than any building in the city. From this Lifta reservoir distributing pipes have been laid to all army supply points, and also to a number of civilian watering points, where standards are erected for the benefit of the inhabitants.

# APPENDIX II.

*List of British Medical Institutions in the Holy Land before the war, with the names of the Medical Officers in each in* 1914, *and the dates of the foundation.*

Considering how very small was Britain's political influence and ambition in Palestine, it is remarkable how much was being done for the material benefit of the people, and how practically all the large centres were occupied by British hospitals. With the exception of the British Ophthalmic Hospital, Jerusalem—under the British Order of St. John of Jerusalem—and the Lebanon Hospital, all the hospitals were connected with "Medical Missions," and were supported in connection with some religious society. Almost all these institutions have been stripped more or less completely of their fittings (beds, bedding, instruments, appliances, etc.); the Gaza Hospital has been completely destroyed; and others have undergone serious structural damage. Altogether the losses and damage, most of it wilful, run into many thousands of pounds.

### Jerusalem.

*British Ophthalmic Hospital* (1882). Dr. D. Heron and Dr. E. A. Thomson.

*English Mission Hospital* (1842, new buildings 1897) (London Jews' Society). Dr. E. W. G. Masterman and Dr. C. H. Corbett.

*St. Helena's Nursing Home* (1910) (Jerusalem and the East Mission Fund). Dr. H. Thwaites.

### Judaea.

*Gaza Hospital* (1882) (Church Missionary Society). Rev. Canon Sterling, M.B., and Dr. Charlotte Purnell.

*Hebron Hospital* (1892) (United Free Church of Scotland). Dr. A. Paterson and Dr. Marian Wilson.

*Jaffa Hospital* (1878) (Church Missionary Society). Dr. R. B. Coleman.

### Samaria.

*Nablus Hospital* (1891) (Church Missionary Society). Dr. Gaskoin Wright and Dr. Ethel Griffiths.



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GALILEE.

*Haifa Hospital* (1895) (Jerusalem and the East Mission Fund). Dr. Coles.

*Nazareth Hospital* (1880) (Edinburgh Medical Mission Society). Dr. F. J. Scrimgeour and Dr. J. Macfarlane.

*Tiberias Hospital* (1884) (United Free Church of Scotland). Dr. Torrance.

*Safed Hospital* (1894) (London Jews' Society). Dr. W. H. Anderson and Dr. Milne.

EAST OF JORDAN.

*Es-Salt Hospital* (1883) (Church Missionary Society). Dr. P. W. Brigstocke.

SYRIA.

*Damascus Victoria Hospital* (1884, new buildings 1897). Dr. F. I. Mackinnon and Dr. J. M. Mackinnon.

*The Lebanon Hospital for Mental Diseases* at Asfuriyeh near Beirut. (A London Committee but considerable International support.) Dr. H. Watson Smith.

Of these medical men thirteen held commissions in the army during the war, and five laid down their lives while doing war service.

# LITERATURE.

## I. Diseases of Palestine and Syria.

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