

HYGIENE AND DISEASE IN PALESTINE IN MODERN AND IN BIBLICAL TIMES.¹

By DR. E. W. G. MASTERMAN.

(Continued from Q.S., 1918, p. 119.)

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

¹ As these articles will subsequently be reprinted in book form, and in order to make them as accurate and complete as possible, Dr. Masterman would welcome any suggestions or criticisms which readers may be willing to send him.

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 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 fellahin, 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.

PART II.—DISEASES OF THE BIBLE.

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 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, 9; 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 *schechter* (slaughterer), though undoubtedly of value as ensuring the con-

demnation 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 uncleanness) 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, but that merely ceremonial and not literal cleansing is the intention may be seen from Numb. ix, 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 urinarius*, 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

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

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, 9; Deut. xxviii, 22, we have קָדַחַת, *kaddahath* (LXX. πυρετός), tr., A.V., in Levit., "burning ague"; in Deut. xxviii, 22, דָּלְקֶת, *dalleketh* (LXX, ῥίσιος, i.e., "intermittent fever"), lit. "burning," probably some fever or inflammation; and in the same verse חַרְחַר, *harhur* (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, 6; Deut. xxviii, 22, is שָׁחַפֶּת, *shahhpeheth*, 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. כָּלְיָוִן, *killayōn* (Isa. x, 22, tr. "destruction," 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) דִּבֶּר, *déber*, lit. a "driving" or "snatching away" (cf. Arab. دبر, "death"), Levit. xxvi, 25; 1 Kings viii, 37, tr. "pestilence," Deut. xxviii, 11, 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) מַגְפָּה, *maggefah*, 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, 6, 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) נִגְעָה, *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) נִגַע, *nega*, lit. a "blow," tr. "plague" in referring to the death of the firstborn in Egypt (Exod. xi); 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, *makkâh*, 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) קָטַב, *keteb*, 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, smallpox, 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 smallpox, the "blains," אִבְעָעוֹת (LXX., φλυκτίδες), being explained by Talmudic writers as "pustules," and an epidemic accompanied by "boils" and "pustules," being probably smallpox; 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 עֲפָלִים, '*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 images of them, together with the tumours, were fashioned in gold. The Heb. עֲכָבָר, '*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 num-

bering 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 (*מִקֵּקֶת*, *mākalet*), also their eyes and their tongues. The imagery may have been suggested to the prophet by confluent smallpox.

To **skin diseases** there are many references in the Old Testament, particularly under the heading *צָרַעַת*, *zara'ath* (from root *צָרַע*, 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 *zara'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 *zara'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 diseases 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 *zara'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 *zara'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 *zara'ath* of the Old Testament, and (2) that the *zara'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 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) שָׁחַת, *sē'eth* (LXX, οὐλή, a "scar" or "cicatrice"), Levit. xiii, 2, 3. The root-meaning of the word is a "lifting up" or "rising," hence, perhaps, a "pimple" or "boil." (2) סַפְּחַת, *sappahath* (LXX, σημασία, lit. a "signal"), Levit. xiii, 2, a "scab," root-meaning uncertain. (3) בְּהָרַת, *bhahereth* (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) מְחִינת־בְּשָׂרָיו, *mehinat-besharav*,

māhyath-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 (*shehin*) the patient was declared to be "unclean." 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 נִתְּקָה, *nethek* (LXX, *θραύσμα*), 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 (*tinia*, *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. بَيْضٌ, *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:—חֲרָס, *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*; יַלְפֶּת, *yallepheth* (LXX, *λειχήν*), root-meaning to "cling to," hence tr. "scabbed" (Levit. xxi, 20; xxii, 22); יַבְבֵּלֶת, *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; גָּרַב, *gārābh* (LXX, *ψώρα ἀγρια*, 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 scabiei*, 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 (*shehîn*) 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*), smallpox (*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* (שִׁגְגֹּ'וֹן, *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. xx, 20). 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 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) 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 ff.).

Insolation (sunstroke) is incidentally mentioned in Psalm cxxi, 61; 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 **אַסָּרָה**, *i.e.*, 'Yahwé healeth'" (Cheyne, article "Asa," *Ency. Bibl.*).

"Rottenness" (**רָקָב**, *rākābh*) 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 "crookbackness" of Lev. xxi, 20. The lameness of Mephibosheth in both his feet, consequent upon a fall when five years old (2 Sam. iv, 6), 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 **שָׁבַר**.

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, 22; Exod. xxii, 10 ("hurt" = "get a broken limb"); Isa. xxx, 26; Jer. vi, 14; viii, 11; x, 19; xiv. 17; xxx, 12, 15; Hosea vii, 9; 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, 21; xxxviii, 28), 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 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, 31; 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. 1, 2; Jer. viii, 29, was primarily a healer of wounds; the apothecary (רֹפֵא) 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.

(To be continued.)