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A TREATISE ON PLAGUE.

Treatise on Plague. By Dr. W. J. Simpson. Pp. xxiv+466. (Cambridge: University Press, 1905.) Price 16s. net.

THIS volume deals with the historical, epidemiological, clinical, therapeutic, and preventive aspects of plague, and it marks a distinct and important addition to what has hitherto been written about the subject. It gives a careful and well arranged summary of many writings, ancient and modern, which deal with oriental plague. Many of the ancient writers, some interesting and basing their statements on carefully observed facts, others less interesting and largely fanciful, are here succinctly placed side by side, and the advances or the reverse evolved out of them for subsequent generations are described in chronological order. What the reader of this volume will at once perceive as a marked difference from other works on plague is the recognition of the important bearing of the discovery of the *Bacillus pestis* as the real cause of the disease, and its influence on our knowledge of the manner of spread of the disease and its prevention. In these respects Dr. Simpson, as an epidemiologist of recognised standing, and by his practical knowledge of the bacteriological aspect, is in a distinctly more favourable position than previous writers on plague.

The subject-matter is dealt with in four parts in twenty-one chapters. Part i. gives an account of the history and distribution of plague from the earliest recorded times down to the end of the nineteenth century—chapter i.—and comprises accounts of plague in Syria, Arabia, Mesopotamia and Persia, Egypt, Lybia, Constantinople, and the west of Europe, including Germany, Italy, and England during the sixteenth and seventeenth centuries. The references to the various writers are everywhere carefully given, and include writers like Procopius of Caesarea, Evagrius of Antioch, Gregory Bishop of Tours, Paulus Diaconus, A. v. Kremer, Nicophorus Gregoras, Guy de Chauliac, Ed. Maunde Thompson, Patrick Russell, and Dr. C. Creighton's "History of Epidemics in Britain." This chapter i. contains in thirty-nine pages a review of a vast amount of interesting literature not readily accessible to the ordinary student.

Chapter ii. deals separately with plague in India, which at the present time is of special interest to English readers. Before the seventeenth century, since when more or less accurate records are available, "the history of plague in India is veiled in obscurity. That plague did prevail in India in or before the eleventh or twelfth century is certain, for in some of the Puranas which are at least 800 years old there are references to the disease and instructions to the Hindus as to the precautions to be taken in the event of its appearance. One of these is that whenever a mortality among the rats of a house is observed the inhabitants are to leave" (p. 40). There is evidence of extensive pestilences in India in the

fourteenth, fifteenth, and sixteenth centuries. At the beginning of the seventeenth century plague broke out in the Punjab and spread over different parts of India, the outbreaks in Surat, Bombay, and Bijapur towards the last part of the seventeenth century having been of a particularly virulent character.

"Nothing more is heard of the disease (p. 46) on the western side of India until 1836, when the Pali plague broke out in Marwar in Rajputana and lasted until 1838 (Dr. Forbes)," and according to the same authority this epidemic was brought from Asia Minor and Mesopotamia. Next comes the consideration of Garwhal and Kumaon (both at the southern slopes of the Himalayas), which are held by all authorities to be an endemic centre; "fortunately this centre is comparatively an inactive one as regards its powers of diffusion." Simpson, therefore, does not countenance (see also later) the somewhat sensational suggestion by Hankin that the epidemic in Bombay in 1896 and since was due to importation by fakeers from Garwhal. Chapter iii. deals in an exhaustive manner with the present pandemic, which is traced from Yunnan by the trade routes into different parts of China, and finally, in 1894, into Canton and Hong Kong. The outbreak and course of the epidemic into these two places are described from personal inquiries, as also the manner and extent to which these localities became centres of distribution of the plague to Bombay in 1896. The course and nature of the epidemic in Bombay Presidency, its extension into other presidencies and other countries, are illustrated by carefully executed maps.

Part ii. deals with the epidemiology of plague. Having briefly discussed the discovery of the *Bacillus pestis* by Yersin and Kitasato as the real cause of the disease, the author gives an account of the morphological and cultural characters of the microbe, of its vitality under various adverse conditions (heat, cold, drying on various substances) as asserted by various observers, and finally of its general effect and its pathogenicity after inoculation into rodents (chapter iv.).

In chapter v. the relationship of epizootics to plague is fully described. That rats and mice are susceptible to natural infection has been observed and mentioned by many writers, ancient and modern (Book of Samuel, vi., Bhajawata Purana, Nicophorus Gregoras, Lodge, Forbes, and many others). Dr. Hunter, of Hong Kong, and the author himself have published charts (reproduced) which give a comprehensive account of the parallelism of the human plague and rat mortality. While it is universally admitted as proved that in some epidemics the mortality of rats from plague coincides with the appearance of plague in the human being—either preceding it, synchronous with it, or following it—there is, on the other hand, good evidence (collected by the Indian Plague Commission, and discussed by Dr. Bruce Low in his Reports and Papers on bubonic plague, 1902) to show that epidemic outbreaks of plague in the human subject are not necessarily connected with plague in the rat. This is a point which ought not to be lightly passed over; it is unfortunate

that in recent years it has been assumed by some epidemiologists that the essential factor in the appearance and spread of plague is the rat, whereas there exists good evidence that plague was introduced into, and broke out in, a locality in which neither antecedently nor concurrently any such epizootic was noticed—to mention, amongst others, the outbreak of plague in Oporto, and in Glasgow, 1900. No one questions the fact that plague has occurred on board ships in which plague rats had been found, nor that such rats on landing may carry and spread the disease amongst rats on shore, which themselves become a focus for plague amongst human beings; but it would be a serious omission on the part of sanitary officers were they to assume that this is the only, or even the chief, mode of importing the disease overseas or from one locality to another.

Chapter vi. deals with the different views regarding the etiology of pandemics and epidemics of plague, views which, with few exceptions, fall within periods antecedent to the discovery of the *Bacillus pestis*, and attributed a primary causality to influences which we now know to be accessory, though important, circumstances in the dissemination and spread of the disease, as, for instance, famine, scarcity, insanitary disposal of the dead, and others.

The known variations in diffusive powers of epidemics and the effect of seasonal influences are considered in chapter vii., and are illustrated by charts and diagrams, without, however, bringing us nearer to an explanation of the fact that seasonal influences play an important part, unless we accept as seriously meant the statement by Gottschlich, according to whom the seasonal periodicity of plague in Egypt is to be explained by the seasonal breeding period of the rat (p. 158).

The variation in virulence of plague epidemics is dealt with in chapter viii., and is illustrated by an account of various epidemics which have occurred in Astrakhan and Vetlianka, 1877-8; Avignon, 1348; Kathiawar, 1820; Pali, 1836; Marseilles, 1720; Egypt, 1834, and others. From these the author concludes that not only do epidemics amongst themselves show great variations in virulence, but that an at first mild epidemic is succeeded by one of great virulence in the same or subsequent years, and further that the various types may be running concurrently in the same locality and at the same time, e.g. at Kathiawar, Pali, Marseilles, Russia, and other places. The often observed fact that glandular swellings without fever may precede or follow plague prevalence is dwelt upon, without offering for it a satisfactory explanation, beyond the suggestion that variation of virulence may be due to change in virulence of the *Bacillus pestis* with change in the surrounding physical conditions, or to differences in susceptibility of those attacked, such as are brought about by scarcity and famine, poverty, insanitary dwellings, &c.

The conditions which foster endemicity and epidemicity are considered in chapter ix. The influence of the various at present existing endemic centres on dissemination of plague to exotic countries, the different conditions (poverty, misery,

deficient food, overcrowding, insanitary dwellings) under which the various peoples have lived and still live, as, for instance, in the Himalayas, in Bombay, Canton, Hong Kong, Cape Town, and others, play an important part in predisposing to plague, "and it is in a population living under these social and local conditions that plague usually commits its greatest ravages" (p. 193).

The modes of dissemination from one locality into another and within an infected locality are described in chapters x. and xi. respectively. As to the first, illustrations are given that plague travels by the most frequented trade routes, that persons sick with or incubating plague carry infection, so also infected clothes and personal effects; that infection conveyed to a new centre (infected cargoes and infected rats) may affect rats before human beings; that owing to panic caused by plague breaking out in a given locality, open and secret flight of inhabitants are instrumental in the dissemination of the disease. In the dissemination of plague within an infected locality, importance is attached in the first place to the high infectivity of the pneumonic form of plague, as contrasted with simple bubonic plague, which is not directly infectious. Next stands the infectivity of the septicæmic form, in which the excretions contain the *Bacillus pestis*, wherefore clothes and rats play an important rôle. In the conveyance of plague from the rat to man, the part that insects—fleas, lice, bugs, ants—play is brought into prominence. In support of this theory, no valid experimental evidence is brought forward; what there is mentioned is more of the nature of strong belief. It is to be regretted that such prominence is given to this mode of dissemination, seeing that beyond the theoretical possibility, namely, that a blood-sucking insect of a plague-infected animal the blood of which, presumably, contains the *Bacillus pestis* might be the means of causing by its bite cutaneous inoculation of a new individual, including the human, there is not sufficient evidence that such has actually been observed either naturally or experimentally. All the direct evidence at present available is of a negative character. The numerous modes of conveyance of plague from man to man, from rat to rat, from rat to man and *vice versa*, which have actually been observed both under natural as also under laboratory conditions (chapter xiii.) are quite sufficient to account for all the facts without ascribing to the flea any other than a very restricted and accidental rôle, if any.

Part iii. deals with plague in the individual. The morbid anatomy and pathology, including histology and distribution of the *B. pestis* in the different tissues, are described in chapter xii., as also the details of several autopsies of typical plague cases; whereas chapter xiii. gives an extensive description of the various channels by which an individual may receive the infection—the skin, and hence directly into the lymphatics; the skin, and hence directly into the bloodvessels; the mucous membranes, particularly of the fauces; the respiratory tract. The author accepts the three-fold grouping of plague infection made by the Indian Plague Commission

according to the duration of the incubation period in well ascertained cases.

The clinical symptoms, temperature charts, and some excellent photograms of the various forms of buboes in the living, the clinical history, treatment, and *post mortem* appearances of several specially selected cases are treated in a very readable manner in chapter xiv. While chapter xv. deals with the diagnosis and prognosis both from a clinical and bacteriological point, chapter xvi. is specially devoted to treatment, dealing with the methods used in the past, before the intimate nature of plague had been recognised, and in the present day, when Yersin's serum is extensively employed, giving statistical tables of the results of the use of this serum in Bombay, Karad, Karachi, Oporto, Natal, Hong Kong, and Brisbane, as also of Lustig's serum (p. 325), of that of Bondi and Terni, and of Kitasato.

This chapter concludes with a general account of prophylactic measures to be employed in an infected house, and of the injection of Haffkine's prophylactic into persons who have been exposed or are likely to be exposed to infection. Of the value of this prophylactic Dr. Simpson has no doubt, and recommends its immediate application.

Part iv. deals with measures for prevention and suppression of plague, those that were employed before the discovery of the *Bacillus pestis* (chapter xvii.), as also those at present in use (chapter xviii.). Amongst the former the measures used by the Venetians in 1348—in advance of all other countries and nations—deserve special notice, inasmuch as those measures were the first of a rational and organised nature, and practically are fundamental for all subsequent improvement and enlargements—lazaretto system of isolation, quarantine of men, merchandise, articles, and objects of various kinds. Amongst the existing measures are those agreed upon by the different Governments at the Venice Convention of 1897, and at the Paris Convention of 1903. Amongst the latter the importance of the destruction of rats is receiving a prominent place. While the use of fumigation of ships by means of the Clayton process, described in detail (pp. 359–365), unquestionably deserves the first place, undue prominence is given by the author to the Danysz bacillus (capable of causing acute fatal disease in rodents) as a means of rat destruction in localities other than ships. Owing to this prominence, the use of this microbe seems liable to lead to considerable disappointment; while the results of distributing with the food either cultures of this microbe or animals infected with it in the laboratory has been fairly satisfactory in some localities in destroying rats, in other localities it has been unsatisfactory. In some of the warehouses in the London Docks we distributed several dozens of cultures prepared by, and bought directly of, Dr. Danysz, as also a number of subcultures mixed with various foodstuffs, and a number of rodents (guinea-pigs, mice, and rats) dead after injection with virulent culture of the microbe; but while all these materials had been taken away by the rats of the warehouse, there was not a single

dead rat found in consequence, nor was there afterwards any diminution of their number noticeable. Such unsatisfactory results have been observed also in other localities; it appears that the result depends not only on the virulence of the cultures (difficult to control), but also, and in a marked degree, on the species of rat. Moreover, recent observations show that even rats of the same species, but derived from different localities, are not susceptible to the Danysz virus in the same manner and to the same extent. The use, therefore, of the Danysz bacillus in one form or another can at best be considered only as a half-measure. It is precisely against half-measures, so frequently and so readily resorted to by indolent corporations and powers that be, that the author justly raises his voice in no uncertain manner (chapters xviii. and xix.), and we cannot help regretting that such prominence should have been given to a method falling far short of the drastic measures required to ensure the safe destruction of this dangerous vermin.

Chapter xx. is entirely devoted to a description of the nature, use, and results of preventive inoculation with Haffkine's plague prophylactic. The volume finishes with a reprint of the results of the International Sanitary Convention of Paris of 1903 *re* plague and cholera.

From the foregoing summary it will be seen that Dr. Simpson's "Treatise on Plague," dealing as it does with the disease from every aspect, is worthy to take a place in the foremost rank of the literature of the subject, and we have no doubt that it is destined to become an important and valuable aid to the student, the medical officer of health, to the epidemiologist, the sanitarian, and last, but not least, to the administrator. E. KLEIN.

ASTRONOMICAL STEREOGRAMS.

Our Stellar Universe. A Road-Book to the Stars. By Thomas Edward Heath. Pp. 75. (London: King, Sell and Olding, Ltd., 1905.) Price 5s. net.

Our Stellar Universe. (Six Stereograms of Sun and Stars.) By Thomas E. Heath. (London: King, Sell and Olding, Ltd., n.d.) Price 3s. net.

IN the first of these two volumes Mr. Heath has collected and amplified several articles which previously appeared in *Knowledge*, and in which he made a satisfactory attempt to bring home to the understanding of "the man in the street" the knowledge so far available as the result of the determinations of stellar parallaxes. It is, truly, as the subtitle indicates, a "road-book" in which the contours, or perhaps one should say the depths, as well as the directions, are plainly shown.

The text is really a simple, detailed description of the eight figures contained in the volume, all of which have been especially prepared by the author himself. Fig. 1 shows the sun and his attendant planets drawn to scale. In Fig. 2 the relative distances of all stars known to be within sixty light-years of our system are shown by placing the objects on a background formed by a map of the home counties, taking Greenwich as the point of departure,