

CONTENTS.

PART I.

HISTORY AND DISTRIBUTION OF PLAGUE.

CHAPTER I.

	PAGE
PLAGUE FROM THE EARLY CENTURIES TO THE 19TH CENTURY	1
<p>Definition.—The antiquity of plague.—Plague in Syria, Egypt, and Lybia.—The first recorded pandemic.—Account of the plague at Constantinople by Procopius.—Account of the plague at Constantinople in 558 by Agathias. Account of the plague at Antioch by Evagrius.—Information scanty concerning other countries attacked.—References to the pandemic by Gregory, Bishop of Tours.—Account of Paulus Diaconus.—Plague in Ireland.—Plague from the 7th century until the Crusades.—General retrocession and quiescence of plague in Europe, Egypt, and Syria for several centuries.—Plague at the time of the Crusades and after.—The second recorded pandemic, later called the Black Death.—Constantinople one of the gateways by which the pandemic entered Europe.—The course of the pandemic as described by an Arabian author.—Pandemic distinguished by its rapid spread and destructiveness.—Guy de Chauliac's description of the plague at Avignon.—Le Baker de Swynebroke's account of the epidemic in England.—Plague in the 15th, 16th, and 17th centuries.—Plague in London in the 16th and 17th centuries.—Recrudescences and epidemic waves from old endemic centres.—Remarkable cessation of plague in Western Europe at the end of the 17th century.—Plague in the 18th century.—Plague in West Barbary.—Plague in the 19th century.—Disappearance of plague from Turkey and Egypt in the middle of the 19th century.—Recrudescence of plague in Arabia, Mesopotamia, Persia, and Benghazi.—Plague in the province of Astrakhan.</p>	

CHAPTER II.

PLAGUE IN INDIA	40
<p>Plague in India.—Plague in the early part of the 17th century.—Plague in the Punjaub.—Plague in Ahmedabad.—Plague in Agra.—Plague at the end of the 17th century.—Plague in the 19th century.—The districts of Garhwal and Kumaon endemic centres of plague in India.</p>	

Contents

XV

CHAPTER III.

	PAGE
THE PRESENT PANDEMIC	48

The present pandemic originated in Yunnan, one of the Western Provinces of China.—Topographical description of Yunnan.—Trade routes from Yunnan.—Condition of Yunnan in 1871 as observed by M. Rocher.—M. Rocher's account of plague in Yunnan.—Epidemic preceded by sickness and mortality among rats.—Dr Lowry of Pakhoi gives first medical account of plague in Southern China at Pakhoi.—Plague first appeared at Pakhoi in 1867.—Trade route from Pakhoi to Yunnanfu.—Plague endemic in Pakhoi from 1867 to 1884.—Plague not extinct in adjoining prefecture to that of Pakhoi.—Plague at Mengtze, 1874 to 1893. Plague at Nanningfu and Kwaium in 1893.—Plague at Canton in 1894.—Canton connected with the chief towns and districts of Kwangsi and Kwantung.—Plague in Canton in January, 1894.—Hongkong the largest and most important European possession near Canton.—Plague discovered in Hongkong in May, 1894.—The plague bacillus discovered in Hongkong by Dr S. Kitasato and later by Dr Yersin.—Plague in Macao in April, 1895.—Canton and Hongkong become centres of distribution of plague.—Plague at Bombay in 1896.—Commencement characterised by mildness and slow extension.—Opposition to the adoption of preventive measures.—Progress of the disease associated with the migration of rats.—Height of the first Bombay epidemic in Feb., 1897.—Extension of the disease to the Bombay Presidency and to other provinces in India.—Slow diffusion of the plague.—Severity of epidemics at Dharwar and Poona.—Extension of the plague to other Presidencies.—Gradually increasing mortality from the plague in India.—Extension of the plague from India and China to other parts of the world.—Distribution of plague in different parts of the world.—An endemic centre in Uganda.

PART II.

EPIDEMIOLOGY OF PLAGUE.

CHAPTER IV.

NATURE OF INFECTION	76
-------------------------------	----

Earlier views on the nature of infection.—Discovery of the plague bacillus and the evidence as to its causal relationship.—Morphological and staining characteristics of the plague bacillus.—Cultural characteristics.—Involution forms.—Characteristic growth in bouillon.—Formation of stalactites.—Kitasato's plague bacillus.—The vitality of the plague bacillus.—In different media.—Effect of cold.—Effect of heat.—Effect of sun.—Effect of drying.—Variation in virulence.—Effect of the plague bacillus in animals.

CHAPTER V.		PAGE
THE RELATIONSHIP OF EPIZOOTICS TO PLAGUE		96
<p>Rats and mice susceptible to natural plague infection.—Relationship between certain epizootics and epidemics of plague a current belief for many centuries.—Observations of epizootics associated with plague epidemics.—Plague-stricken rats, their appearance and behaviour.—Cats affected with plague.—Other animals affected with plague.—Result of experiments to produce plague in animals.—Experiments by German Commission.—Experiments on animals by Austrian Commission.—Haffkine's experiments.—Wilm's experiments.—Experiments on a large scale carried out in Hongkong in 1902.—Plague in man possibly not infrequently caused by food contaminated with plague infection.—Plague in animals under conditions of natural infection.</p>		
CHAPTER VI.		
DIFFERENT VIEWS AS REGARDS THE ETIOLOGY OF PANDEMICS AND EPIDEMICS OF PLAGUE		130
<p>Some questions related to spontaneity.—Origin of plague long attributed to putrefaction of dead bodies, or to great physical disturbances.—Pariset's theory.—Creighton supports Pariset's views.—Mortality of rats from plague not against Pariset's theory.—Origin of plague attributed to great calamities, cosmic and telluric.—The Black Death preceded by great disturbances in the balance of nature.—Creighton places the origin of the Black Death on the borders of the Euxine or Black Sea.—Considerations showing the difficulty and even the impossibility of now locating the origin of the 14th century pandemic.—Volcanic eruptions are recorded to have rendered plants and herbage poisonous.—Great multiplication of disease germs associated with lean or famine years.—Exceptional meteorological conditions preceded the epidemic of plague in Hongkong.—Scarcity preceded plague in India.—Abnormal season preceded epidemic of plague in Hongkong.—Unusual season preceded epidemic of plague in Cape Town.—Conclusion.</p>		
CHAPTER VII.		
VARIATION IN POWERS OF DIFFUSION OF EPIDEMICS, AND THE EFFECT OF SEASONAL INFLUENCES ON THEM		143
<p>Variation in diffusive powers.—Self-limiting plagues.—The existing pandemic possesses comparatively small diffusive powers.—The danger of existing pandemic.—Plague epidemics and seasonal influences.</p> <p>Plague epidemics occur at particular seasons of the year.—Temperature affects the endemicity of plague.—Season a composite force.—Mr Baldwin Latham's analysis of the influence of climatic factors on plague.—The varying condition of the soil and its fluctuating temperature likely to have an effect on microbic and insect life.—The temperature of the air itself not directly influential.—At the end of the plague season infected articles lose their infectivity, but may regain it the following season.—Instances.—The same observation has been made in regard to small-pox and vaccine.—Seasonal periodicity of plague, and seasonal breeding period of the rat.</p>		

Contents

xvii

CHAPTER VIII.

	PAGE
VARIATION IN VIRULENCE OF PLAGUE EPIDEMICS	159

Variation in virulence.—Mild epidemic of plague at Astrakhan and Vetlianka.—The Vetlianka outbreak suddenly acquires great virulence.—Early malignity of the Avignon epidemic of 1348, with its pneumonic symptoms followed by a less malignant type.

Different types with varying degrees of virulence may be seen running concurrently or following one another in the same epidemic.—Four different types of plague in the Pali epidemic of 1836.—Five degrees of severity noted in the Marseilles epidemic of 1720.—Three degrees of severity observed in the Russian epidemic of 1771.—An *Aura Pestilentiæ* noticed in the Egyptian epidemic of 1834–35.—Three degrees of severity in the Egyptian epidemic of 1834–35.—Sporadic cases of mild plague may precede severe epidemics of plague, or they may bridge over the intervals of epidemics.—The import of glandular swellings before and after plague prevalence.—Presence and absence of certain symptoms in different epidemics.—Extraordinary and coloured sweats in the plague of London.—Plague may increase in virulence if it appears in the same locality in successive years.

Variation in the virulence of the disease dependent on conditions to which the microbe and those attacked are exposed.—Natural immunity.—Plague commits its greatest ravages on people subjected to depressing influences.

White people have a fairly uniform mortality from plague wherever they may be attacked.—Susceptible races may become less susceptible out of their own country.—Susceptibility may vary in the same race in different localities.—Variety of type is seen in all infectious diseases.

CHAPTER IX.

FOSTERING CONDITIONS OF ENDEMICITY AND EPIDEMICITY	176
--	-----

Discrimination between recrudescence and endemicity.—Endemic centres.—Kurdistan.—Kumaon and Garhwal.—Characteristics of the outbreaks.—Poverty of the inhabitants, exceptionally insanitary houses and close association of animals and men.—Dr Francis' description of the houses.—Dr Planch's description of the houses.—Conditions in Yunnan.—Conditions in Assyr.—Fostering conditions of plague prevalence similar in exotic localities to those in endemic centres.—Paris in the 17th century.—Oporto in the 19th century.—Canton in the 19th and 20th centuries.—Hongkong in the 19th and 20th centuries.—Bombay in 1896.—The chawls of Bombay.—The crowded buildings in Mandvi.—The Jains and their indifference to death.—A scene in a Bombay building.—Mortality in the Bombay outbreak of 1896–97 small owing to preventive measures.—The three conditions in city of Bombay observed by experts.—Notes of a morning's inspection in Bombay.—Cape Town.—Plague chiefly a disease of the poor.—A Chinese village.—Macao.—Conclusion.

CHAPTER X.

	PAGE
DIFFUSION AND MODES OF DISSEMINATION	194

Plague is transportable, but requires certain carriers for its dissemination.—Plague travels by the most frequented trade routes.—Persons sick or incubating plague carry the infection to other localities.—Healthy persons sometimes carry the infection.—Infection transported and disseminated by infected clothes.—The infection conveyed to a new centre may affect rats before human beings.—Additional risk of extension from an infected locality during the height of an epidemic.—The infection carried long distances in ships.—Transport of infection facilitated by the movements of crowds.—Transport of infection may be by vehicles other than infected persons or infected clothes.—Instances of infection being connected with cargoes and infected rats.—Cape Town.—Mossel Bay.—East London.—Durban.—Osaka.—Rhajpur.—Pisco.—Callao.—Asuncion.—Unsie.—Inland towns sometimes infected by conveyance by railway of rats infected with plague or rat-infected merchandise.

CHAPTER XI.

MODES OF DISSEMINATION IN AN INFECTED LOCALITY	210
--	-----

Pneumonic types of plague infectious.—Septicaemic plague infectious.—Original source of infection in the house of Kaviraj Dwarka Nath in Calcutta.—Bubonic plague not directly infectious.—Dissemination by infected clothes.—Dissemination by infected rats.—Special value attaches to the observations in South Africa and Australia.—Observations in Hongkong.—Observations in India.—The agency by which plague is transmitted from the rat to man.—The flea theory.—In the 16th and 17th centuries cats, dogs, pigeons, and fowls were believed to spread plague.

Ancient belief in the possibility of insects conveying infection.—Plague bacilli detected in ants, bugs, and flies.—The rôle of animals other than rats in the dissemination of plague not judged to be important from existing observations.—The tarbagan (*Arctomys bobac*) subject to an epizootic much like plague.—The disease in man contracted from sick tarbagans.

PART III.

PLAGUE IN THE INDIVIDUAL.

CHAPTER XII.

MORBID ANATOMY AND PATHOLOGY	226
--	-----

Skin.—Lymphatic glands.—External primary buboes.—Veins in the vicinity of the bubo affected.—Internal buboes.—Secondary buboes.—Histological changes in primary bubo.—Histological changes in secondary buboes.—The plague bacillus.—Spleen.—Circulatory system.—Respiratory system.—Liver.—Alimentary canal.—Urinary system.—Nervous system.—Autopsies.—Bacteriological condition.—Histological condition.

Contents

xix

CHAPTER XIII.

	PAGE
CHANNELS OF INFECTION	249

Infection through skin direct to the lymphatics.—Power of the bacillus to enter the system through a small lesion in the skin without producing a local reaction at site of inoculation.—Infection through the skin direct to the blood vessels.—Older view is that plague is a general disease, and that buboes are its local manifestations.—Infection through the mucous membrane.—Infection through the respiratory tract.—Mixed infection.—Mode of exit of infection from the body.—The duration of infectivity of convalescents.—Incubation period of plague.

CHAPTER XIV.

CLINICAL FEATURES	260
-----------------------------	-----

Different classification or types of plague.—Plague with and without buboes.—Incubation period.—The benign bubonic or *Pestis minor*.—The grave bubonic or *Pestis major*.—Causes of death.—Progress after the 6th or 7th day.—Septicaemic plague.—Pneumonic plague.—Characteristic symptoms.—Symptoms considered in relation to systems affected.—Temperature.—Temperature charts.—Lymphatic system buboes.—Contents and condition of buboes.—Size.—Pain.—Tenderness.—Termination.—Situation.—Inguinal buboes.—Axillary buboes.—Cervical buboes.—Multiple buboes.—The skin petechiae.—Gangrenous pustules or carbuncles.—Nervous phenomena.—Vascular system.—Blood.—Digestive system.—Urinary system.—Respiratory system.—Complications and sequelae.—Eye diseases.—Marasmus and chronic plague.—Pregnancy.—Arthritis.—Concurrent diseases.—Second attacks.—Cases of plague.—Ambulant variety.—Septic and fulminating variety.—An atypical case.—Plague pneumonia.—Dr Manser's illness.—Dr Müller's illness.

CHAPTER XV.

DIAGNOSIS AND PROGNOSIS	306
-----------------------------------	-----

Diagnosis generally not difficult in a typical case of plague.—Bacteriological test.—The serum test.—The absence of lymphangitis.—Chief difficulty arises from the Protean character of plague.—Ambulant plague.—Septic type.—Pneumonic plague.—Influenza and plague.—Tonsillar plague.—Prognosis.—Caution as to prognosis.—Favourable signs.—Unfavourable signs.

CHAPTER XVI.

TREATMENT	316
---------------------	-----

Curative treatment powerless in the most virulent forms of plague.—Treatment of plague in the past.—Bleeding.—The evacuant treatment.—The stimulant and tonic treatment.—Oil friction treatment.—Treatment of buboes.—Cold water treatment.—Suggested antiseptic treatment.—Basis of the present day treatment of plague.—Attempt at specific treatment.—Observations on the

	PAGE
sera prepared by Yersin, Roux, Calmette, and Borrel.—Amoy.—Bombay.—Karad.—Karachi.—Oporto.—Glasgow.—Cape Town.—Natal.—Hongkong.—Brisbane.—Observations on Lustig's serum.—Observations on Prof. Terni's and Bondi's serum.—Observations on Kitasato's serum.—Dosage of serum.—Antiseptic treatment.—Carbolic acid.—Cyllin.—General treatment.—Nursing.—Hygienic conditions.—Medicines.—Local treatment of buboes.—Treatment of carbuncles.—Treatment during convalescence.—Prophylactic measures in an infected house.—Use of disinfectants.—Protective inoculation.—Personal hygiene.—Hygiene of the house.	

PART IV.

MEASURES FOR PREVENTION AND SUPPRESSION
OF PLAGUE.

CHAPTER XVII.

MEASURES EMPLOYED BEFORE THE DISCOVERY OF THE BACILLUS . 333

Two periods to be considered.—Preventive measures depend on the views which are held concerning the cause of the disease.—Trespass offerings.—Removal from plague-stricken locality.—Fumigation of the dwellings and attention to diet.—Prayers and processions.—Resignation and fatalism.—Disposal of the dead.—Isolation of the rich.—First preventive measures of an organised nature in Venice in 1348.—First governmental measures in 1374.—Lazaretto established by the Venetians in 1403.—A council of health and quarantine established in 1485 in Venice.—The Venetian system of quarantine.—Preventive measures against extension of plague to other countries.—Measures in Austria and Germany in 16th century.—Educational tracts and pamphlets in 16th century.—Measures in London in 16th century.—First government orders issued in London in Henry VIII's reign.—Orders more severe in the reign of Elizabeth.—Severity of measures in Aberdeen.—Enlightened policy in Edinburgh.—First quarantine station for London established in 1664.—Special plague officials appointed in every parish in London.—Regulations in London against the plague in the 17th century.—Hodges opposed to the shutting up the sick and the well in the same house.—Dr Mead's views in 1720.—Advocacy of the establishment of hospitals and quarantine stations.—Evacuation of infected houses.—Passport system for those wishing to leave infected towns.—First Quarantine Act passed in reign of George IV.—International preventive measures introduced in 1831 and 1838.—Disappearance of plague from Turkey and Egypt attributed to these international measures.—Other causes also at work.—Failure of measures to prevent spread of strong invading epidemics, and the possible cause.—International conferences of European Powers to consider measures of mutual protection against epidemic disease from the East.—New basis for maritime preventive measures adopted at the Vienna Conference, 1874.—Quarantine and sanitary cordons brought into requisition in the Russian outbreak of plague in 1879.

Contents

xxi

CHAPTER XVIII.

	PAGE
EXISTING MEASURES AGAINST PLAGUE AFTER DISCOVERY OF BACILLUS	354

Measures to prevent importation of plague.

International measures.—Regulations of the Venice Convention of 1897.—Merchandise to be prohibited or disinfected if thought necessary, but not quarantined.—Quarantine on land frontiers abolished.—Quarantine not abolished for certain classes and pilgrims.—The measures agreed upon at the Venice Convention though useful did not stop altogether the importation of plague.—Regulations of the Paris Conference of 1903.—Local measures.—Methods employed for the destruction of rats on board ships.—The Clayton process for the destruction of rats and disinfection of ships.—Strength and properties of the gas.—Precautions to be taken in carrying out the fumigation.—Uses of the Clayton disinfector on board ship.—Disinfection of baggage.—Necessity to be in a state of preparedness.—Local measures to be adopted in anticipation of an outbreak.—Certain principles should underlie the erection of plague hospitals.—Health camps.—Arrangements for disposal of the dead.—Administrative arrangements.—Bacteriological examination of rats.—Destruction of rats in a healthy locality as a precautionary measure.—Methods available for the destruction of rats.—Traps and poison.—Fumigation with Clayton's apparatus.—The employment of Danysz' bacillus.—A careful watch on prevalent sickness required, especially in the poorer quarters.

CHAPTER XIX.

MEASURES TO COMBAT AN OUTBREAK OF PLAGUE IN A LOCALITY .	372
--	-----

Preliminary observations as to the hindrances to a locality being declared infected with plague.—Commercial, political, and social forces nearly always range themselves against the first announcement of plague in a town.—Controversies in Bombay, Calcutta, Cape Town, and San Francisco.—Reported cases of suspected plague in Johannesburg.—Rats.—No disease which creates so much alarm as plague.—Firmness and judgment required from the commencement.—Measures necessary at the commencement not suitable when the epidemic is beyond control.—Accurate diagnosis essential and its difficulties.—Plague organisation previously planned to be mobilised.—Notification to be supplemented by visitation of houses and other measures.—Information to householders.—Bacteriological examination of rats.—Outline of a plague organisation.—Duties of the plague organisation.—The most important measures for the suppression of plague.—Segregation.—Evacuation of premises.—Circumstances modifying retention of contacts.—Existing methods of disinfection cumbersome and unsatisfactory.—The newest and best method of disinfecting a house infected with plague is fumigating with Clayton's apparatus.—To prevent recrudescences.—Fumigation has its limits.—Employment of chemical disinfectants.—Burning and exposure to high temperatures.—Boiling.—Exposure to the direct rays of sun for three or four days.—Sanitation.—Destruction of rats.—Destruction of rats by the employment of the virus of Danysz.—Attenuation and exaltation of virulence of virus.—Manner in which cultures of Danysz' bacillus were used in Cape Town.—Use of Danysz' cultures

PAGE

in the outbreak of plague at Odessa.—Other methods employed.—Symptoms in rats suffering from the Danysz' bacillus infection.—Post-mortem appearances.—Bacteriological examination.—General biological characters.—Staining.—Rapid differential tests.—Confirmatory differential tests.—Acute toxic cases.—Destruction of rats in warehouses, etc.

CHAPTER XX.

PREVENTIVE INOCULATION 402

Haffkine's plague prophylactic based on his cholera prophylactic.—Preparation of Haffkine's plague prophylactic.—Method of inoculation.—Effect of the inoculation.—Results of the inoculations.—Instructions to persons inoculated.—The prophylactic of Lustig and Galeotti.

CHAPTER XXI.

CONCLUSION 410

More precise information required regarding plague.—The facts known and established regarding plague.—The main lines on which enquiry is needed.

APPENDIX I.

Reported deaths from plague in India in 1904, extracted from the official weekly returns 414

APPENDIX II.

THE INTERNATIONAL SANITARY CONVENTION OF PARIS, 1903;
 With Appendices, translated by Theodore Thomson, Esq., M.D.

PART I. GENERAL PROVISIONS.

CHAP. I. PROVISIONS TO BE OBSERVED BY THE COUNTRIES SIGNING THE CONVENTION ON THE APPEARANCE OF PLAGUE OR CHOLERA IN THEIR TERRITORY 416

Section I. Notification and subsequent communications to other countries . 416

Section II. The conditions under which a local area may be regarded as infected or as having ceased to be infected 417

CHAP. II. MEASURES OF DEFENCE ON THE PART OF THE OTHER COUNTRIES AGAINST TERRITORIES THAT HAVE BEEN DECLARED INFECTED 418

Section I. Publication of measures prescribed 418

Section II. Merchandise.—Disinfection.—Importation and Transit.—Baggage 419

Section III. Measures at Ports and Land Frontiers 420

Section IV. Measures at Land Frontiers.—Travellers.—Railways.—Frontier tracts.—River-ways 426

Contents

xxiii

PART II. SPECIAL PROVISIONS REGARDING COUNTRIES		PAGE
OUTSIDE EUROPE.		
CHAP. I. ARRIVALS BY SEA		427
<i>Section I.</i> Measures at infected Ports on the Departure of Vessels		427
<i>Section II.</i> Measures regarding ordinary Ships from infected Northern Ports on their arrival at the entrance to the Suez Canal or at Egyptian Ports		427
<i>Section III.</i> Measures in the Red Sea		428
<i>Section IV.</i> The organisation for securing surveillance and disinfection at Suez and at Moses' Wells		431
<i>Section V.</i> The passage of the Suez Canal in Quarantine		433
<i>Section VI.</i> Measures in the Persian Gulf		435
<i>Section VII.</i> Persian Gulf Sanitary Stations		436
CHAP. II. ARRIVALS BY LAND		437
<i>Section I.</i> General Provisions		437
<i>Section II.</i> Turkish Land Frontiers		437
PART III. SPECIAL PROVISIONS REGARDING PILGRIMAGES.		
CHAP. I. GENERAL PROVISIONS		437
CHAP. II. PILGRIM-SHIPS.—SANITARY STATIONS		438
<i>Section I.</i> General conditions applying to Ships		438
<i>Section II.</i> Measures before Departure		440
<i>Section III.</i> Measures during the Voyage		441
<i>Section IV.</i> Measures on arrival of Pilgrims in the Red Sea		444
<i>Section V.</i> Measures for Pilgrims returning home		448
CHAP. III. PENALTIES		451
PART IV. ADMINISTRATION AND CONTROL.		
I. The Egyptian Sanitary, Maritime and Quarantine Board		452
II. The Constantinople Superior Board of Health		453
III. The Tangier International Board of Health		455
IV. Miscellaneous Provisions		455
V. The Persian Gulf		456
VI. International Health Office		456
PART V. YELLOW FEVER		457
PART VI. ADHESION AND RATIFICATION		457
APPENDIX I. Regulations		457
APPENDIX II.		459
APPENDIX III. Resolutions		459
INDEX		461