The cholera : its origin, idiosyncracy [i.e. idiosyncrasy], and treatment / by Ferdinand E. Jencken.

THE CHOLERA:

ITS

ORIGIN, IDIOSYNCRACY, AND TREATMENT.

BY

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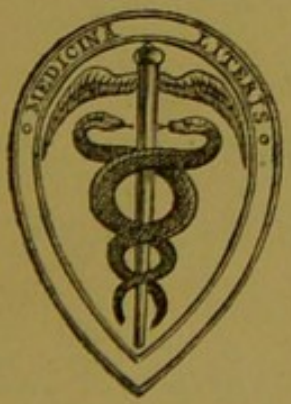
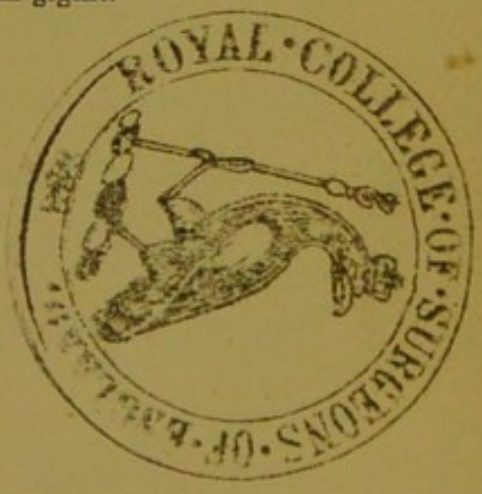
Sicut mors miasmata, ita morbus contagium gignit.





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PREFACE.

THE following treatise was concluded towards the latter end of last year; but the epidemic having at that time almost disappeared, I considered it more appropriate to defer publishing the same until a return of this pestilence was to be apprehended. The Cholera, having again made its appearance in several localities, and there being reason to believe that it may, ere long, revisit our shores, I no more hesitate in bringing this little work before the public, in the hope it may be favourably received by my readers.

I have in this undertaking been in part assisted by my father's published and unpublished writings, especially with reference to the early epidemics, the vivid description of which,

given in his peculiar aphoristic style, I have, with a few necessary alterations and additions, in accordance with the progress and spirit of the age, almost exclusively rendered in his own words.

F. E. JENCKEN.

KINGSTOWN;
August 12*th*, 1867.

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INTRODUCTION.

PERHAPS there has been no epoch in history so distinguished for its manifold development in the practical and the learned spheres as the present. The improvement in our physical welfare, the extension of commerce and the facilities afforded to industry, the impetus given to mechanical inventions, and the means and appliances placed at our disposal for entering upon every kind of investigation, and performing the boldest and most delicate experiments with unprecedented accuracy, have so entirely contributed to engross mankind in the philosophy of materialism, that the importance of cultivating the mind any more than relates to the appreciable phenomena of the visible creation is, if not altogether overlooked, yet greatly underrated. Let us for a moment reflect upon the difference that exists now and a century ago, and the comparison strikes us

with a sensation of wonder and pride, not only as regards the arts and sciences, but also in respect to the immense display of human wit and ingenuity brought to bear upon the daily necessities of our existence; the cutting of roads, canals, and railways, and the application of steam, both as an agent of locomotion, and as a substitute for labour; the untold discoveries in chemistry, optics, hydrostatics, and pneumatics, together with the adaptation of galvanism to the telegraph, have indeed metamorphosed the aspect of the world, and induced a physical prosperity, a rapidity of progress, unheard of in days gone by. The reverence for the ancients, entertained in former days, has with the present generation subsided into no more than a just appreciation of their real worth; and, though the classics are still taught in the schools and expounded in the universities, the necessity of adapting the education of youth to the increased demands of the age is apparent to all; thus, the range of study has been inevitably extended beyond what was thought to be sufficient in times gone by. But with this increase of learning has also arisen the necessity of acquiring a large amount of

practical knowledge, which, improving though it is, when it comes to us by degrees, and in the course of our experience, is nevertheless in its preponderance injurious to the young, by destroying the originality of the mind, and suppressing that inherent flight of thought and fancy, which is not only the ornament, but the privilege of our earlier years. The age we live in is a transition period; the old has been rejected, and the new is not yet come; and, like in natural history, where one organ is about to be developed, its future formation is announced by an accumulation of redundant material in the preceding species, as seen in the trunk of the elephant, the antlers of the stag, and the double pair of hands in the simial tribe, foreshadowing the wonderfully versatile hand in the human race, so also in our times there exists an undue desire of bringing together a mass of crude and incongruous material, which it will take the work of generations to arrange and assimilate. Thus it happens that whatever branch of knowledge we survey, we remark an indifference to, or a loathing of anything like speculation; and phenomena or occurrences that would otherwise contain matter

for the deepest and most important discussion, are lightly passed over, or merely considered in their practical bearing, with little or no regard to the higher lesson they teach. What in poetry and the fine arts we should be inclined to term the lack of ideal conception, or an absence of that exuberant inspiration, which has ever been the source of all that is truly beautiful and genuine is, in the realm of science and philosophy, the want of a leading idea, or a governing principle. It is this deficiency that is palpable in everything that we read and hear of; and it is a true saying that, though we have mastered much that our ancestors knew nothing or little of, the days of the master minds have entirely gone by. In Medicine, we grieve to say, this shortcoming is most apparent of all, and the reproach cast upon physicians that since Dioscorides' times no progress has been made in the application of remedies to diseases, is not altogether unmerited. Illnesses are still treated according to hearsay, or upon the loosest principles, chemical or otherwise; and when a calamity like typhus, diphtheria, cholera, or a plague breaks out amongst the brute creation, it is regarded

as a catastrophe which, though we may deeply lament, it is out of our power to avert. Anatomy, physiology, as well as the other collateral sciences of medicine, have contributed immensely to unravel the most hidden structures and functions of the organism; minute and morbid anatomy have received a new zest by the improvements made in the microscope, by the various modifications of the speculum; the changes wrought during disease in internal organs have been brought under the immediate notice of the eye; the stethoscope playing no small part in assisting our diagnosis and determining by the laws of sound the remotest lesions, the nature and extent of which would otherwise for ever remain occult, even to the most astute observer: and yet no advance has been made in what is of the deepest concern to human suffering—the just appreciation of remedies, and the specific adaptation of these to individual diseases.

Inborn talent will, unaided by authority or precedent, strike out a path of its own, and find by the gift of intuition what the less endowed could only discover by fixed and established rules; but as the operations of genius

are carried on unconsciously in the deepest recesses of the mind, and entirely belong to the realm of divination, the information we derive as to how its knowledge was obtained, and what led its possessor to its particular mode of application, must for ever remain obscure to the generality of mankind. It is only to be regretted that many important suggestions that might have proved of invaluable service to science have, in the greater number of instances, been lost to the world, or, where they happened to have been recorded, they were either too much above the common level of thought, or too much wrapped up in mystic speculation to be received by the multitude, who, constantly swayed by the force of habit, and too willing to bow to authority, have regarded any attempt at innovation with a show of indifference, if not with aversion. What is urgently felt to be required by the present generation is, a philosophic representation of all the sciences; and natural history in particular, so regarded, would lend to the progress of medicine an impetus it had never previously possessed.

THE CHOLERA.

ELEMENTARY ORIGIN OF DISEASE.

That the earth, like all the planets, has undergone a regular and progressive development, from a mere nucleus of vapour to the solid globe it now represents, is no longer a subject of speculation, but an admitted fact. Subsequent to the formation of the plutonic rocks, stratum after stratum was deposited, and with each layer came and disappeared a higher order of vegetation, soon to be followed by living creatures, which, in their turn, came and went, occupying as they were reproduced, a higher stage of development. To presume that after the present formation had been completed, and the primeval gigantic labours of the creation had ceased, the earth's development was over, is a supposition as improbable as it is

untrue; on the contrary, the growth of our planet seems never to have been checked for one solitary instant, the subterraneous working of the globe having, from the most ancient periods, produced earthquakes and volcanic eruptions without number; the deluges likewise recorded in the sacred writings of the Chinese, Hindoos, Persians, Egyptians, and other nations to which history alludes, evidently testify to the then crude state of the creation; and the preponderance of the water over the dry land, even at the present epoch, plainly tells us that the formation of the earth's crust is still in course of progress, and that its growth, though imperceptible to the casual observer, is nevertheless an indubitable fact. Much credit is due to Captain Drayson for the valuable suggestions thrown out in his book, published some years ago on the subject; and M. Agassiz too, in his comments on the glaciers, and the change remarked in their position, involuntarily bears evidence to the same fact. Thus the law of progress, though differently manifested to what it is in the animated kingdoms, also exists in the inorganic realm; and in drawing a comparison between the extinct and living

formations, we are of necessity brought to the conclusion, that the birth of higher generations could not have been accomplished unless the soil had been previously prepared and ennobled for their reception; yet this never ending though imperceptible growth in the dimensions of the earth, conditions a constant afflux of nutrient elements, which, owing to their redundance being only partially assimilated, hover about its surface as unused influences, ready to be absorbed with the returning demand for supply, to which all things dead or living are subject; for, according to the law of change, every atom in the creation receives its food from without, a momentary respite of the overflowing elements, and they pass on, having contributed their due to the maintenance of the matter, to which they were by the law of creation attracted. It is to these unassimilated influences that all the meteorological phenomena are to be attributed, that have lately so much engaged the attention of natural philosophers, and the earthquakes occasionally experienced in countries, otherwise free from such subterraneous explosions, prove how great must be the surplus of free telluric power, to which we are ever and anon exposed.

But not only are we under the influence of terrestrial emanations, but we are also subject to disturbances in the atmosphere, caused by the outshedding of cosmic forces, which exert a decided influence upon our planet and its inhabitants, both for good and for evil; the sun too, with its fiery orb exerts an influence no less potent upon the earth and its atmosphere than the cosmic powers, bringing destruction by the same rays that nourish and fructify the soil: hence, the ancient notion of a wrathful and a loving God; which irreconcilable attributes of the deity are to be traced to the prevalence of solar worship, the foundation of all ancient and modern belief. Finally, comets in their transitory passage through the planetary system, doubtless cause a temporary disturbance in the atmosphere evidenced by strong electric excitement, and it is clearly the transference of this increased meteorological reaction upon the living creation that has given rise to the vulgar prejudice that comets are the forerunners of evil and of portentous events. What is instinct in the inferior creation is divination in man; hence, through the maze of the darkest superstition runs a golden thread of truth, which it

is the province of the sage to unravel. Electricity, being the carrier of all influences far and near, is for the most part the means by which diseases are conveyed and communicated; thus, to ascribe sickness to a modification of electricity is as erroneous as to look for its ultimate cause in the visible alterations of the material world, which could only be brought to light by some hidden operation, occurring in a highly refined and ethereal fluid, from which all materiality perpetually emanates, according to the eternal laws of evolution. Visitations of sickness, therefore, come to us of a sudden and without warning, not by the mouth or by the nostrils, not breathed into the lungs or swallowed into the stomach, as some are wont to describe their ingression, but simply by the act of pervasion: the whole system being at once imbued with a destructive ethereal element, which being too refined to touch the gross organic matter, immediately associates with the plastic ethereal envelope of the organic power, whose equilibrium it deranges, the consequences to the organism, varying in accordance with the individual nature of the disease. The current of epidemics has mostly been remarked to travel

from east to west, beginning in the Asiatic continent and finding its way across the Ural, along the plains of Russia or over the Caucasus, along the shores of the Euxine to Western Europe. The table lands of Asia were evidently the first to emerge from the ocean, affording the earliest habitation for man, and therefore represent the most ancient continent of the globe; since primeval ages it has been the repository of organic remains, both from the vegetable and animal kingdom; and the soil, thus impregnated with this semi-organised matter, offers a multifold series of holdpoints for the production of disease-generating elements which become more virulent in their attack, as by their affinity to the organism, they are the more readily attracted by it, and drawn into its vicinity. Doubtless, the winds and divers electric currents contribute, in no small degree, in conveying these morbid fluids to remoter regions, but the westward direction, so frequently noticed in many of these atmospheric currents, is manifestly due to the earth's passage through the heavens, ever and anon rolling into the contaminated regions; the same as the trade winds, in addition to their being caused by the rushing in of cold air from

the polar hemispheres, are to a great extent engendered by the earth's rotation round its axis, invoking a draught of air in the opposite direction, the atmospheric globe being unable to keep pace in velocity with the motion of the earth. Again, the gigantic rivers by which Asia is traversed, both north and south, the decayed vegetable matter by which its soil is covered, the countless pools of stagnant water arising in consequence of the wet seasons, and diffusing poisonous vapours over its steppes, the dense jungle, spreading over Hindostan, redundant in exuberant vegetation and redolent of Malaria, the moist nature of the soil, especially along the banks of its main rivers, the Indus, Ganges, Brahmaputra and Suttlej, &c., and the potent action of the sun with the concomitant vicissitudes of the seasons from dry to wet, produce an aggregate of co-operating causes for evil, encountered perhaps in no other region of the globe. It is an expression much in use of late, with writers on metaphysics, and matters relating to spiritualism, that the real world is not the visible, but the invisible; which simply means that all things primarily exist in an ethereal element, which refined

envelope is the eternal attribute and accompaniment by which all matter, organic or inorganic is endowed. The elements have their origin in this fluid, light being the first perceptible manifestation of its existence, either in the pure ray proceeding from the sun, the odic luminosity emitted indifferently by all matter, or in the evanescent spark, sent forth by electric explosion.

Light is the first condensation of this cosmic ether, recognisable by the outward sense, and it is only when this condensation is accompanied by an explosive effort that it is termed "Electricity." Electric currents, however, may exist silently, without so manifesting themselves, and it is to this ebb and flow, to this central or peripheral state of the ethereal fluid, perpetually bordering upon the transition to the more plastic elements, that the conveyance of those innumerable latent influences is due, of which we are unable to give any more account, save that they appear and disappear, leaving us as mysteriously as they came. Electricity, therefore, like air, warmth or moisture, is the carrier of the multifold powers that surround us, or rather, the outward form

by which they are evidenced; and a deranged electricity in the atmosphere (as previous to a thunderstorm) not only unsettles the organism by its immediate effect upon the nervous system, but also by interfering with the multifold supply it is wont to receive from without: yet the disturbance is but of momentary duration, and, simultaneously with the calm of the elements, the balance of the organism is restored. The notion that morbific poisons exist in the atmosphere, as infinitely minute germs, is evidently erroneous, as all influences, as we have seen, come to us in an infinitely more refined element than those atomistic particles, which, when they find an appropriate soil for their development, immediately exhibit a higher plasticity, changing from a formless element to a definite shape. If there be, as is supposed, an agglomeration of these infinitesimal atoms floating to and fro in the atmosphere, they can only have spontaneously originated; but it is more in harmony with reason to believe that all influences, whether malignant or otherwise, penetrate the organism in an ethereal form, there to be converted into living matter. The description of these living germs, as given in

the 'Appendix to the Third Report of the Cattle Plague Commission,' will be found worthy of perusal, though the conclusions, drawn from the observations therein contained, savour too much of the materialism of the present day. The recent views taken by physiologists, as to the action of zymotic poisons is also, to my mind, far too palpable for such delicate operations. It is undeniable that a particle of morbific matter, introduced into the system, after having lain, so to speak, dormant for some time, gradually begins to multiply and work in the economy, like leaven in the bread; but this multiplication of living germs is rather to be attributed to proximate infection, than to an abstract increase of the one particle brought into apposition with the organic tissues. The whole organic pile is hourly, nay, momentarily renewed, rapidly passing through each stage of development, from the smallest blood globule to the most complicated structure; but, in accordance with the law of fluctuation, no development is absolutely stable, being easily shaken in its course by the sudden aggression of adventitious currents, which, seizing upon an accidentally weak locality, interfere with the

onward progress of its tissues to their proper stage of development, a depraved nutrition, or an inferior organic plastic tendency being the result. Thus it is that infections, when introduced into the circulation, are communicated from point to point, till, at length, all the tissues being imbued with the poison, an increased action of the system is produced, which varies in locality and character, according to the nature and inherent affinities of the virus. Where the constitution has been suddenly pervaded by a toxic influence in an ethereal element, the changes of such a fluid, from a peripheral to a more central state, is readily explained, happening, as it does, upon an already prepared and organically related soil; but where, for instance, a single living germ is thrown into the body, as in the process of inoculation, the *modus operandi* is somewhat different; in this instance, no broad current of elementary fluid passes through the body, but a minute portion of the individual odic element penetrates the system, as the everlasting attribute of matter, and once there, it attracts its own from without, till the organism, roused to resistance, commences its work of expulsion;

hence the communication of disease by general influences, or immediate contact. From the earliest times, diseases have been divided into contagious and infectious; the Greek and the Roman physicians frequently allude to this distinction in their writings, yet, strictly speaking, though it be necessary for clearness of description to classify diseases according to their nature and symptoms, there is in reality not so great a distinction between infection and contagion as is generally fancied.

All diseases are infectious that come to us by atmospheric influences, only becoming contagious by their sojourn in the body, and the peculiar modification they thereby undergo, probably from the animal organic character by which they are subsequently imbued: thus cholera, at its acme, becomes contagious, readily passing into typhus; the same with puerperal fever, which is decidedly not infectious at the onset, only becoming so in hospital wards, as ably shown by Dr. Denham, in his inaugural treatise published shortly upon his assuming the Mastership of the Dublin Rotunda Hospital. The sam emay be said of a variety of diseases, particularly fevers, the mildest of

which have an innate tendency to take on the typhoid type, under unfavourable circumstances. Of all diseases that have appeared in Europe since the last thirty years, spreading havoc and desolation at each repeated visit, cholera has perhaps been the most disastrous; the first accounts of it, given by British medical officers in India, were published as far back as 1817, but the probability is that this plague to humanity has existed from time immemorial, and that history has only failed in not accurately recording its character and symptoms. The alvine fluxes noted by Greek and Roman physicians may possibly, in some instances, have been true cholera, indiscriminately recorded under the name of dysentery. Cholera must again have been a potent cause of destruction to the Crusaders, among whom typhus fever and dysentery raged with unrelenting fury; the Arabian physician, Avicenna, also alludes to a malignant form of diarrhœa. It is certain, however, that no extensive epidemic of cholera has been known to exist in Western Europe, until about thirty years since, when nations were startled with the intelligence that the dreaded foe was rapidly advancing in

its deadly march. Moscow, as well as the entire district on the banks of the Wolga, were the first to be attacked; it soon spread to St. Petersburg, where, from the marshy nature of the soil, it speedily assumed gigantic proportions, no less than 15,000 dying in six weeks, in the year 1831. Livonia was the next to be invaded, till, descending along the Baltic, it rapidly involved Germany, France, and Italy, passing over to the British Isles, and extending to the shores of Spain. What rendered this calamity the more direful in its effects was the utter helplessness of the faculty, and their confessed ignorance as to the pathology and management of this plague. Since then, the public have been furnished with many able reports on the course, symptoms, prognosis, and diagnosis of the cholera, together with a minute description of the organs and tissues, as they appear after death; the textures, blood, and secretions from the body have been analysed; chemistry and the microscope have been brought to bear on the subject, and yet with all the experience of the past, and the improved appliances at the command of modern science, no clue has till now been afforded

which might tend to help us in arriving at a true understanding of its individual character. Why we should have thus failed in our exertions is, I think, only too apparent, when we look back upon the many shallow and contradictory theories advanced upon the subject; and here we must again allude to the fatal mistake made in philosophy by all modern thinkers; I mean that of ascribing all effects, however reason tells us to the contrary, to visible or palpable causes alone, instead of to the joint operation of visible and invisible agents. Whether a poison act upon the blood, lymph, viscera, or other tissues of the body, it is always explained as consisting of minute particles floating in the air, and making their entrance into the body by some particular channel or other, as either the lungs or the stomach, instead of regarding all the subtler influences as existing in a highly refined and ethereal medium, needing no special inlet to pervade the system, a mere recipient tendency on the part of the organism for any special element being sufficient to ensure its ingress. Hence, in the severer epidemics, as typhus and cholera, bad housing, over-crowded cities, much frequented highways, the march-

ing of troops, and as has been shown of late, the host of unclean and ill-fed hordes, that yearly resume their pious pilgrimage to Mecca, are enough to kindle and spread the deadly effluvium. We shall see, in the sequel, to what extent the cholera is infectious, and how much its propagation is due to mere contagion.

PICTURE OF THE CHOLERA.

I am chiefly indebted for the following account of the Cholera to my father, Dr. F. J. Jencken, who had ample opportunity of witnessing this terrific scourge in several of the worst epidemics, both in St. Petersburg and London; and the description he gives of it will, I am sure, be read with interest by all who have made this singularly fatal malady their study, as not only conveying a graphic picture of the disease as it then appeared, but also by offering many valuable suggestions as to its nature, pathology, and the inferences to be derived from both with regard to its subsequent treatment.

It is rarely ushered in by a sensation of

bilious derangement, as pressure in the præcordia, lassitude, want of appetite, &c.; the more urgent symptoms commonly appearing at once: they begin with giddiness, prostration, alternations of cold and heat, speedily accompanied by anxiety and cramps, beginning at the toes and spreading upwards as they continue; twitchings of single muscles, rheumatic pains in the limbs, fixed pain in the calves and head; nausea, vomiting, diarrhœa, with tearing colicky pains, and unquenchable thirst for cold drinks, tormenting its victim. The abdomen is deeply drawn in, the skin shrivelled, the borborygm incessant, the tremulous pulse sinks more and more; the icy coldness of the limbs gains in intensity, the tongue feels cold to the touch, the extremities become livid; the secretion of the skin and kidneys being arrested from the commencement. The urine, previous to its suppression, is rich in albumen and tube-casts; soon, however, both disappear, giving place to a substance which, upon the addition of concentrated nitric and sulphuric acids, turn to a violet or purple colour, in many instances becoming almost black, whilst in others it exhibits a beautiful play of colours, proving the

disposition of the kidneys to eliminate the carbonaceous matter of the blood, an office otherwise performed by the liver and spleen. The quantity of phosphates is, for several days, commonly much increased; the free acidity in the beginning is excessive, though sometimes the alkaline principle predominates.

The half-closed and convulsed eyes are injected with blood; though the faculties are impaired from the commencement, the delirium never increases to madness, as in the plague. The chest is oppressed, and the patient moans in a hoarse and plaintive voice (*vox cholerica*), racked by a perpetual and burning weight in the scrobiculus; the colicky pains also proceed from solitary burning points in the abdomen. Finally the body collapses rapidly, after an immoderate quantity of fluid, often of a black colour, has been ejected both above and by the rectum. The whole body is seized by convulsions, which finally play in the muscles of the neck.

The beating of the pulse and heart is no longer perceptible, and death approaches under convulsive sobs. Muscular twitches, as though from galvanism, are often remarked to continue

even when life is extinct. A peculiar acid smell in the air of the sick-room, together with the putrid vapour collected from the bedewed window-panes, or the filamentous germs obtained by passing the air containing the blue mist through gun cotton, and treating its solution with appropriate reagents, are perhaps the only visible traces we are able to discover as evidencing a miasmatic change in the atmosphere.

Such are the most essential symptoms, though they often depart from their normal course; in many instances there only exists dry colic, with vomiting and syncope; sometimes even the colic is altogether absent, the malady continuing with all the signs of utter prostration; cramps and coldness of the whole body. At others they are suddenly laid prostrate with trembling of the hands, and cramps in the limbs, followed by the usual train of phenomena. The more rapidly the coldness increases, spreading to the heart, the quicker the powers begin to fail (giving to the body the livid collapsed appearance) the more sudden is the approach of death. But where the vital powers succeed in mastering the virulence of the disorder, the

pulse rises imperceptibly, the coldness of the extremities reaches less high, is less icy, anxiety and colic diminish, the activity of the skin awakens, and with it the urinary secretion is increased; stools and vomiting become less frequent, the dejections even assuming a bilious aspect; the evacuations become critical by the expulsion of a flocculent, clayey-looking substance; the urine grows more abundant, and ranges in specific gravity from 1020 to 1060, according to the amount of water passed. In females the generative system often participates in the eliminative process, the critical operation being, according to Spencer Wells, manifested by uterine epistaxis, or by a sudden appearance of the menses, as witnessed in my own practice. The convulsions are silenced, and returning consciousness brings back revived hope and renewed vitality in all the systems. More frequently though, depressing diarrhœa remains, or typhus with prolonged exhaustion may supervene. The main features of the European Cholera are, prostration with anxiety, muscular pains, coldness and failing pulse with violent colic, characterised by vomiting and purging, and expulsion of an immoderate

quantity of serous fluid (whilst the activity of the skin and kidneys are checked), accompanied by cramps beginning from the extremities, with lividity and collapse of the body. In the East Indian Cholera the serous discharge is said to be somewhat less copious, the proclivity to the tonic being greater than to the clonic spasms, its course less rapid, and its contagious character not so observable; at the same time the malady appears to take on a more inflammatory type.

AUTOPSY.

GENERAL APPEARANCES.

Extreme rigor mortis; soon after death the abdomen becomes tympanitic, being often inflated with gas, though decomposition is slow. The corpse exhibits a dusky lividity, deepened in dependent parts, and most apparent about the lips and organs of generation. The venous dissolubility of the blood is manifested in a most marked degree; the heart is more or less contracted with ecchymosed patches on its outer surface; right side filled with dark tarry-

looking blood, though not coagulable, extending to the left side along the stems of the arteries and its ramifications, even to the venous system; the pulmonic arterial capillary vessels are contracted, and refuse to admit the depraved venous blood propelled into them by the main trunks of the pulmonary arteries; the brain is deeply injected, and is studded all over with ecchymosed points, in its grey substance similar to those seen on the external surface of the heart. The decarbonization of the blood, being for the most part suspended, the offices of the liver are no longer required; hence its size is generally normal or but slightly enlarged, its substance being of a pallid hue, and the gall-bladder distended with bile. The functions of the spleen being likewise interrupted, it is small and often friable; the disintegration of its substance arising probably from the want of coagulability in the blood. The vessels of the mesentery are often gorged to excess, the mucous surface of the intestines is injected and studded over with ecchymosed patches; the serous membranes are dry; the peritoneum is lined with a viscid, glutinous substance; the intestines are matted together, with a doughy

feel, and lie heaped upon the spine; the arachnoid of the cord and brain is unaltered, owing to its contiguity to the sensorial and locomotive systems, the functions of which are not primarily impaired; the kidneys are injected in their cortical layers; the bladder is either empty, or contains a small portion of creamy-looking fluid. The entire burden of the cutaneous, serous, and renal secretions seems to lie on the mucous membrane of the *primæ viæ*, which are found filled with flocculent or pale liquid, identical to the rice-water stools, sometimes showing traces of blood or bile, according to the severity or progress of the disease; the submucous tissue is distended, with a greyish white thick fluid. The large intestines are comparatively little affected, as only instrumental to the ultimate and grossest effort of alvine expulsion. The morbid plastic tendency of the choleraic virus is demonstrable in the intestinal tract, where even polypoid formations are said to have been observed. The solitary glands are considerably enlarged, and Peyer's patches raised; traces of a flocculent matter of the rice-water stools are found in the bronchi and internal coat of the bladder, as betokening

the sympathy existing between all the mucous surfaces; the vitality of the irritable system is considerably suppressed, hence the inaction of the vascular system, the flabby appearance of the muscles, and the collapsed state of the lungs, which are often below the average in weight, and contain but little blood, except in their posterior portion, where a small quantity of dark-looking sanguineous fluid is found. The nervous centres, as not immediately coming within the sphere of the morbid action, are not visibly affected, though a potensated development of the ganglionic system may be presumed, from the vegetative character peculiar to the choleraic poison, whose primary action must of necessity lie on the nerves of involuntary life and the organs of nutrition and reproduction. In cases in which death occurs after reaction, or in the secondary fever, the post-mortem appearances are just what might be expected—a return of the normal secretions, an increased vascular action, diphtheritic deposits in the intestines, together with ulceration of Peyer's patches, as at once evidencing the pseudo-plastic and destructive tendency of the choleraic poison.

PATHOLOGY.

In reviewing the symptoms of the cholera, and comparing these with the appearances presented by the body after death, we are involuntarily struck by the marked physiological change that has taken place in the economy, and particularly in the secretions of the body. The functions of the skin, kidneys, liver, and serous membranes, save those which invest the cerebro-spinal axis, are entirely suppressed, the secretions being almost exclusively performed by the alimentary canal, upon which the entire burden of elimination now rests. Owing to the immense drain of water from the system, the blood too is changed in its natural constitution; instead of exhibiting a uniform liquid, which easily passes through the cavities of the vessels, it is thick, dark, and tarry, though not coagulable; from the solid ingredients being carried away by the dejections, it is deprived of its earthy constituents, chiefly the chloride of sodium; the vitality of the vascular system, as well as the homogeneousness of the blood, is, in fact, tempo-

rarily suspended; the choleraic poison, seeming to exert a direct influence in arresting the functions of the vascular system, and serous linings. This supposition is likewise borne out by the revelations of the microscope, from which it appears that all the soft mucous surfaces, especially that of the intestinal canal, are stripped of their columnar epithelium, of which the cells, in a modified condition, are discovered to abound in the rice-water stools, leaving the villi quite denuded. A very accurate account of these phenomena, as published by Dr. Lionel Beale, in a series of articles, will be found in the 'London Medical Times and Gazette,' for the year 1866. The entire intestinal system, as has been demonstrated, is, in the cholera, made to vicariate for the skin, kidneys, and serous membranes; instead, therefore, of being a chiefly absorbent surface, destined to convey the chyle into the circulation, it is forced to become an entirely secreting agent, thus repudiating the special office for which it was originally destined; the villous structure, wherever we behold it, in the ciliated epithelium of the respiratory surface, in the delicate hair-like projections of the rotifera

and other infusoria of a similar type, in the soft mucous membranes of the ducts and cavities of glands, as in the fœtal portion of the placenta, is either instrumental to the process of absorption, or serves for the attraction of food in the lower animals; or the villi or ciliæ may also be regarded as so many electric points, being a redundance of the irritable principle, as in the respiratory organs, for instance; yet here also they are made subordinate to the necessities of the economy, in rendering the air more assimilable, by the temporary arrest it experiences before entering into the lungs; thus, where an entirely absorbent membrane, endowed with certain properties of vital electricity is converted into an absolutely secreting surface, as in the present instance, its receptive capacity, as represented by the villous structure, must of necessity suffer and waste away, from having fallen into disease, and from being perpetually denuded of its epithelium, which, ever and anon, supplies it with fresh germinal matter. The degeneration and shrinking of Lieberkühn's follicles, though partly due to a diseased action of a chronic character, is, I think, chiefly to be

ascribed to a sudden arrest of intestinal absorption, which, no longer requiring the aid of an intermediate and solvent fluid, suffers these minute secreting organs to perish and waste away. There is no evidence of the renewal of epithelium in the glandular structures, properly so called; as in the follicles of the stomach and intestines, salivary glands and pancreas, urinary and hepatic tubes, the process of elimination, wherever it exists, remaining undisturbed. The ganglionic nodes and centres, it need scarcely be said, are unaltered, though a change must have taken place in their dynamic relation to the other nervous systems, from the amount of expulsive labour put upon the digestive organs. Another feature is the toxic influence the choleraic poison seems to have upon the vascular system; the arteries are contracted, and the veins enlarged and filled with thick venous blood, betraying by its want of coagulability, how deeply its organic vitality has been impaired, its decomposition becoming the more imminent from the great absence of its salts and earthy ingredients.

The contractions of the arteries, particularly of the pulmonic capillary system, is not so much

due to the choleraic poison, acting as an irritant upon their walls, as to the reluctance of the pulmonic veins (receiving as they do arterial blood), to admit a highly carbonized and unassimilable fluid into their ramifications, thus causing a spasmodic effort, by an immediate retrograde action of the pulmonic arteries. The collapse has been attributed by writers to several causes, according to their opportunities of observation, and to the peculiar theories they had *à priori* formed as to the action of the disease, some describing its operation to an increased eliminative process of the intestinal mucous surface, by which an immoderate quantity of water is withdrawn from the system, and with it, an indispensable element removed, together with many necessary ingredients for the carrying on of the vital functions; others, as Dr. Johnson, for instance, to a specific poison, contaminating the blood, by which the arterial capillary circulation, especially that of the lungs, is interrupted; others again to an assault upon the sympathetic and pneumogastric nerves, reducing the life powers of the economy to their lowest ebb. Each of these suppositions is in part correct, but, like all theories derived from

a limited sphere of observation, they are too much built upon isolated groups of phenomena, instead of taking a broad survey of the question in its aggregate sense, a mode of contemplation, by which alone we are able to arrive at a correct conclusion and accurately to distinguish between cause and effect. In my opinion, the collapse is chiefly due to a sudden stoppage of innervation, by the irresistible assault on the system of a deadly element; the nervous system, as in all deeply penetrative operations, being affected in its ethereal investiture, and thus disabled, from presiding any longer over the vital functions of the body; numerous instances of the kind are met with in practice, from the rigors caused by mechanical irritation (as from the simple introduction of the catheter) to the fatal shocks produced by external injuries, as also from severe hæmorrhage, great exhaustion, powerful mental emotion, and the sudden burst of uncontrolled passion. The temperature of the body is below the average, excepting in the rectum and vagina, where it rises by several degrees, showing how actively the mucous membranes are engaged in this disease.

AFFINITIES OF THE CHOLERA.

The affinity of the cholera to recent and former epidemics is most striking; compared to the black death, the sweating sickness (*sudor anglicus*) which not only raged in England, in the sixteenth century, but likewise spread over the greater part of Germany, the similarity is particularly prominent. The venous stagnation, anxiety, syncope, thirst, burning in the abdomen, the immoderate secretion of fluid by the skin, as in the cholera by the mucous surface of the intestines, point to this fact. Promotion of the perspiration was even then the treatment most relied on. In the Hungarian sickness (black death), heartburn, violent colic, headache, lassitude, were the principal symptoms; gangrenous dysentery followed, bilious fluxes were critical; aromatics and diaphoretics were the remedies chiefly employed. The yellow fever, as described by Matthei, Brunel, Reider, and more recently by Wood and other American physicians, shows a decided affinity to the cholera, by its black vomit, its venous dissolubility, its muscular pains, convulsions, and

prostration. So also the *fièvre algide*, or *fièvre pernicieuse cholérique* in Algiers, as given by Haspel, and formerly described by Riverius, in which the analogy to true cholera is even more strongly marked.

Martin, Perkins, and Elliott speak of a tropical fever in India, in which many of the symptoms partake greatly of choleraic type; see Macpherson, 'Cholera in its Home,' p. 68. Lastly, according to Dr. Buhl, the effects of extensive burns, producing excessive agitation and restlessness, and attended with a remarkable difficulty of breathing, and sometimes with nausea and vomiting, resemble greatly those of cholera. The primary morbific cause must here also be looked for in the process of vege table or animal decay, promoting in its action every plastic elementary tendency of a telluric character. As no less related, appears the Egyptian dysentery, which Frank considers to be an enteric typhoid, or nervous fever of the abdominal viscera;* and which often in Indian hospital practice, runs into collapse. Moreover cholera frequently prevails along the coasts of Syria and Egypt, in the West Indies,

* 'Nervöses Fiëber der Eingeweide.'

North and South America, only milder in character, as described by American physicians. In Egypt and Syria it sets in with black vomit, bleeding at the nose, &c., causing death in twenty-four hours. We would also feel inclined to bring all scorbutic affections as they arise during long sea voyages, in low marshy abodes, as the blue variola, spotted fever, particularly as it raged in the sixteenth century, within the circle of its affinity; also various disorders that have prevailed at different periods among cattle, contemporaneously with the cholera, by which they were likewise attacked, as carbuncles, malignant fevers, and even rinderpest, by which our herds have, of late, suffered such frightful devastation. Finally to the same class belongs the Siberian Jaswa in man, which begins as an insignificant sore in the most exposed parts of the skin, rapidly destroying the limb by gangrene, if not speedily arrested by incisions made into the quick and bleeding flesh. That it should originate in the bite of an insect seems questionable; it is more probably induced by the expansive action of single miasmatic atmospheric points, to which many sporadic diseases are due. Indeed, some-

thing allied to the Cholera strikes us in almost all pestilential fevers, as colic, prostration, and paralysis. How much humidity and decay act injuriously upon plants is witnessed in the fungi, which thrive best in moist, shady, and sequestered places, where otherwise wholesome kinds assume a poisonous character, producing, in their toxic action, symptoms allied to the Cholera.

According to Desmoulins, injections of putrid water into the veins of dogs, produced symptoms of yellow fever. Doubtless snake-bites, even the bite of a mad dog, will produce similar phenomena, venous stagnation and nervous inflammatory tension. Prussic acid has, before all other poisons, the property of softening the spleen, distending the veins, and arresting the secretion of the urine; death also supervening under anxiety and convulsions, as a sudden paralysis of all the systems. The mineral substances are less potent than the acrid poisons in bringing on choleraic symptoms; yet among these the action of copper, antimony and arsenic is, of all, the most similar to Cholera. Riverius has pointed out the resemblance of the irritant and the drastic

poisons to this fatal disease, long before this subject received the general attention of the profession. Some French writers have particularly examined the action of oxalic acid in this respect, but with a less happy result. The effects of lead and its salts upon the constitution are too slow and in many respects too dissimilar to be brought under this category, though the resemblance is not altogether wanting; vomiting, excitability, sinking of the powers, failing of the pulse, convulsions, and paralysis, are the usual phenomena, particularly observable in mushroom poisoning, as after the partaking of agaricus. The narcotic substances act, by paralysing the nervous system; the symptoms produced by eating putrid fish, as graphically described by Dr. Sangbush, are highly interesting, as indicating the proximity there exists between animal and choleraic poisoning, whilst the injurious and often fatal effect of the sea mollusc, shellfish, flesh of the dolphin, and other animal substances, may be ascribed to their containing hydrocyanic acid, as formed naturally in the saliva, in combination with sulphur, or developed in it to a higher degree, in paroxysms of rage. Modern pathologists,

from ascribing most diseases to a process of fermentation, have endeavoured to classify cholera among the so-called zymotic illnesses, rendering it akin to scarlatina, measles, small-pox, &c. To enter into a polemic discussion on the subject, would here be completely out of place; but thus much may be advanced, that from its appearance, symptoms, behaviour, and progress, such an hypothesis is altogether untenable, and would, in practice, lead to the most fatal errors. Fermentation, as a truly catalytic or chemical action, is incompatible with the manifestation of vital processes, and as the origin and development of disease, entirely come under this latter category, we must seek for its explanation in the same laws, by which all the living creation is governed. Practical research has doubtless done a great deal for the advancement of science, but philosophy, too, has its work to perform, and the promptings of reason should not be overruled by the abstract formularies of the mere understanding.

CAUSES AND PECULIARITIES.

The etiology of the Cholera has been amply dilated upon in the foregoing sections of this treatise, as well as its course, individuality, and behaviour. It only remains for me to say a few words as to its proximate causes, its prevalence and predilections, before entering upon its therapeutics.

As in most epidemics of a virulent character, the lower classes are those principally affected; lax constitutions, particularly such in whom the venous system is predominant, as women, even in the pregnant state, being more than others exposed to the danger; less so children and old people, both being protected by a deficient receptive faculty, founded either upon an imperfect physical development or upon an evanescence of the organic power. East Indian physicians are all agreed as to the epidemic character of the Cholera in that vast peninsula. In fact, it is never absent, being merely heightened in its virulence, and spreading over a greater range of population under certain meteorological conditions connected with the

recurrence of particular seasons. Thus, the Cholera is most prevalent in dry weather accompanied by either heat or cold, being somewhat less in the latter instance and less formidable, falling to its minimum in the rainy season, whilst it gradually rises to its old proportions as the winter draws near. Dr. Macpherson lays great stress upon this fact, and declares he always felt greatly relieved upon the wet months having fairly set in again. Singular as this fact may appear at first sight, it nevertheless, I believe, admits of a satisfactory explanation. It is well known that the mercury in the barometer almost invariably rises in dry and windy, whereas it is apt to fall in the tube in moist or rainy weather. This circumstance proves two things: that the air is not only heavier on dry days, but that the comparative increase in its specific gravity originates also in the greater increase of its cohesive tendency; this concentrative state being evinced in each of its minute atoms. Thus condensed, it presses with greater weight upon the cup of mercury than under opposite circumstances, giving rise to a corresponding change in the ascending column. In wet or

moist weather the opposite case obtains; the cohesive force of the atmosphere is loosened, its peripheral tendency predominates, and being less able, under so expansive a state, to act upon the mercury, the barometer falls.

These meteorological changes are not merely of interest in a scientific respect, but they have a practical bearing, as we have seen, upon the greater or lesser prevalence of epidemic diseases. The choleraic poison, like all elementary fluids, is so unstable in its existence, that wherever it settles, it requires some hold-point for its further development. This it finds in various ways; but, being of atmospheric origin, chiefly in the air: thus, when the weather is moist and the seasons marked by heavy rainfalls, the Cholera, where it prevails epidemically, is at its minimum, the diminished tension of the air acting as an impediment to the concentration of the poison, which is weakened in force in proportion as each attempt at establishment is rendered either partly or altogether abortive; in dry weather, on the contrary, whether accompanied by wind or not, the choleraic element lights upon a more condensed medium, and being like the air in

which it lives, less likely to be dissipated by extraneous agents, it immediately begins to multiply, until checked in its growth and virulence by the recurring influence of the rainy months, which, in their yearly round, bring destruction to the deadly foe.

Thus, in the more temperate zones, and even in high latitudes, cold weather by no means affords an immunity against the ravages of this disease. The Cholera often prevailing in the depth of winter as far up as Archangel, not even sparing the highest districts and localities otherwise famed for health. A quiescent state of the electric currents invariably coexists with the prevalence of the Cholera, an observation of much value, as proving how much the development and local diffusion of toxic agents is due to local atmospheric stagnation. This truth is borne out by the topography of the Cholera, which shows, in a very interesting manner, how much its contagious character is heightened by certain local and telluric influences; thus it originates in low-lying districts, observes particular directions, appears chiefly at night, where the exhalations of the earth are most abundant, "*nebulæ caligine mistæ exha-*

lantur humo," and is prone to seek the habitations of men. In the Perso-Russian Cholera physicians have clearly traced its beginning to the autumnal season. It is described as following the track of great rivers and canals, and occupying deep glens and shaded localities, where, confined to narrow limits, it gradually assumes the contagious type, when it soon rises to the highest levels, and inflamed by the dryer atmosphere, it rages with relentless fury. No exact information has as yet been obtained as to how long the Cholera sojourned in any single locality, owing to the lingering manner in which it is apt to take its departure, although its first appearance is ushered in with considerable violence. Alluvial soil, being chiefly composed of decayed organic matter, would form a ready nidus for every morbid element akin to the vegetable kingdom; but with dry dust and the laterations rock, it is the minute particles of the one and porous nature of the other which act as an absorbent on the poison, increasing its intensity by the resistance offered in either case to its progress and subsequent diffusion. The existence of stagnant water may act as an excitant to the develop-

ment of the choleraic poison; but the malaria that emanates from it is in no way related to the Cholera in its essence; the progress and symptoms of intermittent fever completely belonging to a different type. Much has been spoken of the blue mist observed in seasons of severe epidemics. I remember distinctly having heard of it as a child, whilst residing at St. Petersburg in the year 1831, and have observed it myself on several subsequent occasions. All that it proves is, the strong plastic tendency temporarily inherent in the atmosphere, leading either to the vegetable or animal side, according to the nature of the latent influences by which the air happens to be permeated.

PROPHYLAXIS.

The science of hygiene and the importance of removing all agents by which sickness is either pre-induced or nourished, has of late been so much dwelt upon, and received so much attention by physicians and philanthropists of all countries, that little or nothing remains to be said on the subject here. The advantages of

cleanliness, ventilation, dry and commodious dwellings, efficient drainage, are constantly and ably brought before the public; yet the proper regulation of the diet appears to me not to be sufficiently understood. A few words, therefore, respecting a question of so much practical moment, may not altogether be out of place. Fruit and vegetables generally are thought to be injurious, and in seasons of Cholera most people, from an unnecessary dread of the consequences, abstain from partaking of these really wholesome articles of food. Both are, indeed—a few kinds excepted—not only harmless, but positively beneficial adjuncts to human diet, by not only introducing into the system ingredients that are not contained in animal food, but also by preventing the blood from assuming that putrescent venous character which it is so apt to do in this terrible disorder; besides which, too great a desuetude from any special nutriment not only interrupts the equilibrium of the economy, but provokes in time a longing for those particular ingredients, thereby inducing, if not gratified, an attraction towards similar tendencies resident in the atmosphere, which in

seasons of Cholera, where the vegetative principle in the air is more than usually abundant may prove extremely injurious. Though an evenly mixed diet is at all times necessary for the proper maintenance of health, it becomes imperative, under certain conditions, somewhat to deviate from this rule, and to partake more of one sort of nutriment than of the other. Thus, where Cholera prevails, a slight preponderance of animal food is decidedly beneficial, not only in stimulating the irritable system against the reproductive, but by the general tone it imparts to the constitution, in enabling it more successfully to resist and grapple with the hostile element. I have in consequence been in the habit of recommending a liberal allowance of roast meat (pork excepted) and new milk, the latter being particularly well borne by young children and old people. Salt provisions are of course objectionable, as also several kinds of fish—salmon, eel, &c., and shellfish; the latter being particularly indigestible, and to a certain extent poisonous. Stimulants, in the true Cholera, are not only useless, but positively injurious; and when we look upon the frightful mortality that has fol-

lowed their exhibition, we cannot but wonder that their employment has not long since been abandoned by the faculty.

With regard to disinfectants, no one can doubt their utility in times of severe epidemics, though not all equally efficacious as antiseptics. They each, no doubt, possess a certain amount of neutralizing power. Chlorine, despite of its being constantly recommended, has not proved so beneficial in its action as might have been expected; though, chemically speaking, a purifying agent, it is, on the whole, too foreign an element readily to fraternise with any morbid poison rendered partially organic by a temporary residence in the body. It is, in consequence, propelled from point to point, till eventually forced to make its way out of the system, pretty well in the same condition as at its entrance; besides which, it is apt to act as an irritant upon the respiratory organs, which is a great objection to its use.

The same may be said of the inhalations of oxygen and ozone, which have recently been tried again with a very questionable success. Carbolic acid, in whatever form used, seems to afford the greatest advantages as a disinfectant,

from being at once an expansive element allied to the organic compounds, and offering an effectual check to all animal and vegetable decay. In the plague and the various pestilential epidemics that raged in the fifteenth century, &c., the burning of tar-barrels in the market and other open places was ordered by the authorities as a means of public safety ; it was also observed that rope-makers and tanners were immune from the plague and all septic fevers, the latter probably from the tonic and astringent exhalation of the macerated oak-bark, whilst the former were protected by the combined bad-conducting electric power of the hemp and the antiseptic properties of the tar. The coating of the walls of large establishments with coal tar, and the placing of open vessels containing equal parts of coal and wood tar in jails, hospitals, barracks, and in the hall and sick-room of private dwellings, has appeared to me the readiest mode of neutralising the toxic element in times of heavy epidemics ; and for many years past I have, in cases of malignant fever, &c., employed no other disinfectant but this. The practical benefit arising from the administration of internal remedies for the pre-

vention of disease, is not so great as might be supposed; at the best their prophylactic action is not to be depended on, and they moreover possess the disadvantage of too much habituating the system to the presence of a foreign auxiliary for the warding-off of a morbific poison, instead of relying for security upon its own resources. The constant wearing of camphor and other aromatic substances as a safeguard against infection is, for the same reason, futile, besides being open to the objection of affecting the head and nerves by the medicinal exhalation with which the body is perpetually surrounded; but should a prophylactic become advisable, I would recommend the exhibition of dilute phosphoric acid, as counteracting the venous dissolubility of the blood, in doses of from one to two drops, in half a wine-glassful of water, once or twice a day. Phosphorus may be regarded as animal sulphur; its acid is in consequence more allied to the living organism than any other of the mineral acids. The hypo-phosphites are therefore preferable to the hypo-sulphites; they offer a decided check to every kind of fermentation, and are strongly disinfectant in their action. To do

good as prophylactics, they should be exhibited in doses of a few grains only, once or twice a day at the utmost. Lastly, I would recommend the use of charcoal, the antiseptic properties of which are universally recognised.*

Cold ablutions in the morning should, whenever practicable, not be neglected, as well as every regiminal and dietetic precaution by

* It might be interesting to know whether the continual partaking of certain vegetable poisons would so modify the constitution as to afford to subjects under their influence an immunity against the cholera. Ergot is a fungous growth upon an organic basis; it enters rapidly into the system, producing in it all the symptoms of a complete dissolution; choleraic diarrhœa being by no means an unfrequent complication. One might, taking these facts into consideration, experiment by inoculating from the blood of an infected subject, or take a small portion of the lymph from the vesicular or bullous eruption which often appears on the skin of the same; or a plan of direct inoculation from the fungus itself might be tried, and its effects on the constitution and its prophylactic virtues carefully watched. The internal exhibition of this substance would, I fear, yield but a doubtful result, partly from its being subject, like all organic matter, to decomposition by the analytic action it undergoes in the body, and partly from its deleterious properties, acting as a bar to its being administered in a sufficiently penetrating dose to accomplish the purpose for which it was given. The best mode of administration would be in the form of an alcoholic tincture, or the liquor ergotæ as used in obstetric practice might be employed.

which the normal oxidation of the blood and tissues is promoted. The choleraic poison, being of atmospheric origin, quarantines are not of much avail; on the contrary, by crowding a large number of subjects together in a comparatively small compass, the contagious character of the illness is undoubtedly heightened, thereby greatly contributing to spread the disorder, and undoing the very object for which the regulation was instituted; besides which, quarantines are often broken, and in countries with a wide line of boundary or an extended sea-coast, are altogether impracticable. All that can be done in severe epidemics is, to board the newly-arrived vessels, to institute a searching inquiry at the frontiers, and to establish temporary hospitals for the reception of the sick, a free pass being at once given to all who have escaped the infection.

Hospitals, save for experimental treatment and the immediate relief of the most urgent cases, have failed to realise the expectations entertained of them in the Cholera. As in all hospitals, specially those set apart for fever, smallpox, lying-in women, &c., the poisonous elements, confined within the walls of one

building, no matter how large its dimensions, multiplies and develops with fearful rapidity; the effluvium emanating from the sick wards being sufficient to contaminate the whole atmosphere, and to impregnate the wood-work, and even the masonry of the establishment. Cholera patients are, therefore, more advantageously treated in their own homes, and in seasons of severe epidemics it would be better to appoint a regular visiting medical staff, instead of lavishing the money in the maintenance of costly institutions, the utility of which is, to say the least, highly problematic.

REMEDIES AND THEIR SIGNIFICATION.

There is in God's creation no individuality so strongly pronounced as altogether to subsist by itself, as a wholly independent centre. The isolate is nowhere conceivable, but all things having sprung into life from one creative thought; each individual point in the universe, though constituting a relative centre of its own, is surrounded at the same time by multifold peripheral relations, more or less intimate

in character, differing in property, according to the radial distance and degree of affinity, each outlying object possesses to any given focus. This everlasting divergence of multifold currents, from countless creative centres, and the perpetual tending of convergent rays to an infinitude of hold points, reciprocally joining and intersecting each other, beget an uninterrupted flow of mediatory action, a mutual exchange betwixt all things living and existing, in short that beautiful and inviolable harmony of the whole, by which the integrity and indestructibility of the universe is everlastingly sustained. This principle of mediation is manifested in numberless ways; in the law of progression, the fusion of two opposite poles to a higher unity, in the development of man, his social relations, in the operations of the mind, and the contingencies of daily life. But in this instance we have exclusively to deal with the mediative processes, negociated by the living organism, its flaws and its strong points, its capabilities and shortcomings, its triumphs and its defeats. Interrupted mediation is endangered integrity, begetting a temporary suspension of a given function; a contest ensues, the discordant notes

are gradually solved, and harmony is finally re-established by a neutralization of conflicting powers.

To restore this process of mediation is the province of the physician, who, by selecting his agents from the numerous substances contained in the different realms of nature, administers in each individual case, such simple or compound agents as possess a double affinity, either to the symptoms of the malady and the physiology of the remedy, or the organ affected, and the particular agent employed. Thus remedies hold an intermediate position between the living economy and the outer world, and it is the establishment of this principle that leads us to the important doctrine of parallelisms, a doctrine from which alone a sound and philosophic treatment may be expected.

TREATMENT.

It has been amply shown in the previous pages that all diseases are more or less of telluric origin, with a leaning either towards the animal or vegetable pole ; that the cholera, from

its relation to the humid principle, the mode and season in which it is generated, the impetus it gives in temperate and high latitudes to vegetation, &c., &c., decidedly belongs to the latter class, and that in so doing, it attacks the membranous system, chiefly the serous, the functions of which, together with those of the vascular system, it temporarily suspends, causing the mucous surface of the primæ viæ to vicariate in their stead, whilst the blood, even to the ramification of the arteries, is made to assume a venous character, thus destroying the balance previously existing between the two sanguiferous systems. Such is, in a few words, the history of this fatal malady; and its treatment, to be efficacious, must keep its origin, individuality, causes, pathology, &c., continually in view. The principles of cure are mainly three: to destroy or neutralise, if possible, the plastic vegetative poison by which the economy has, without warning, been prostrated; to restore the equilibrium of the secretions; and to preserve and foster the waning spark of animal heat. The first acquirement is of all the most difficult to fulfil, for though we may be thoroughly conversant with the history and

philosophy of a disease, the determination of its ultimate essence is entirely beyond the reach of human skill, and our best specifics have, with a few exceptions, almost always been the result of accident, and will continue to remain so until the reciprocal affinity that exists between nature at large and the living economy is better understood, and the important docrine of parallelisms more generally recognised. Diarrhœa being, in seasons of an epidemic, a very suspicious symptom, it should always be most carefully watched, and no means neglected to arrest it at the first onset.

If of a mild character, the patient should at once wear a silk or flannel binder round the abdomen, or what would be better, if procurable, one woven of hemp and silk, or wool and raw silk; in fact, a binder like this might be worn with benefit whilst the sickness lasts, as nothing is so efficacious in warding off the infection as the preserving of an equable temperature over the abdomen; he should at the same time be confined to his room, and observe a costive diet. Should, however, the sickness be ushered in by severer symptoms, no time should

be lost in putting him to bed, covering the abdomen with an eider down or soft feather pillow, keeping the feet warm, and in short using every precaution to elicit a gentle perspiration. Two small mustard poultices and blisters should simultaneously be applied to each side of the umbilicus, the former removed after a short time, and the latter allowed to remain till a decided impression on the skin or the usual vesicle is formed. What is, however, better than either of these, is a vesicating fluid composed of two parts of collodium, and one part of bromine, cautiously applied in the same locality in small circumscribed spots, about the size of a groat; as its action is very caustic, and a sore unwarily made is extremely difficult to heal. If there be much thirst, rice- toast- or gum-water may occasionally be administered in small quantities, with the addition of a few drops of the tincture of wormwood to each tumblerful of the beverage prescribed. Internally if the diarrhœa be of a bilious character, a drop of the tincture of nux vomica may be given at first, and, if neces sary, repeated after some hours, followed by a few drops of sal volatile, or solution of ammo-

nia,* with a little myrrh and castoreum in some mucilaginous vehicle. I have found the following formula, prescribed by my father, very useful:—

℞ Tr. Myrrh.,
Tr. Castor., āā gutt. xx;
Ol. Menth. Pip., gutt. v;
Spir. Ammon. Arom., seu
Liq. Ammon., ad ʒss.
M. S. Capiat gutt. 5 quâque horâ.

Where, however, the diarrhœa arises from a debility of habit, I have seen more advantage from the exhibition of the *milder* tonics and astringents, as exercising a greater control over the disorder.

But, instead of a simple bilious diarrhœa, or cholerine, the true Asiatic cholera only too often sets in without warning, and then, in addition to the regimen previously recommended, more energetic measures should be promptly adopted. Instead of nux vomica, a single grain of calomel should be given, with two or three of charcoal, and as many of sugar of milk, or, what is better still, a very small

* Ammonia being the best known antidote in all maladies originally contagious, or that have assumed the contagious type.

dose of arsenic immediately, to indifferentialize the choleraic power; subsequently a few drops of ammonia, either alone or in the combination already mentioned, should be administered in any suitable vehicle, or in a small quantity of equal parts of gum arabic and sugar of milk finely powdered, every hour or two; the advantage of the arsenic is, that it may be continued alternately with the ammonia, without lowering the system as mercury does. The practical utility of administering the remedies in a condensed form cannot be overrated, and considerably tends, together with the diminution of the dose, to increase the chances of recovery. The thirst may, instead of by means of the usual drinks, be allayed by small pieces of ice, which is very grateful to the patient, besides checking, by its frigid principle, the predominance of any toxic element by which the system happens to be pervaded. The extremities should simultaneously be rubbed with hot flannels, friction being, in all cases, more patent in restoring the organic warmth than passive heat. The apartment should be spacious and airy, moderately warm, and disinfected, in the manner described before. Or

another line of treatment may be resorted to with equal advantage; sulphur, in any of its forms, being most destructive to every low organic growth, either animal or vegetable, the liver of sulphur freshly prepared in doses of from one to three grains may be given hourly, or every two hours, in a little water, and the body washed with a solution of the same in the proportion of half an ounce to a quart or so of tepid water, the patient being rapidly dried with warm cloths, and tightly wrapped in a thick blanket; the organic heat in favourable cases soon begins to return, cutaneous action commonly setting in after the lapse of a few hours with pains and tearing in the limbs, followed by an amelioration in the symptoms. Or instead of the liver of sulphur, one or two drops of the hydro-sulphurate of ammonia, or simple carbolic acid may be administered; the rest of the treatment being conducted as before. In hospital practice, blankets fumigated with sulphur may be substitued for the liver of sulphur washings. In the stage of collapse, where the absorbent function is all but suspended, the solution of ammonia in drop doses, or the Ol. Animal (Dippel), as used in Russian practice,

may be given with advantage, simply with the object of tiding over the imminent catastrophe, by gently encouraging the system to reaction, whilst we patiently await the resuscitation of the vital energies. Or we may endeavour to restore the sinking vitality by rousing the serous membranes to action, and this is best accomplished either by directly acting upon the same, by the pure acrids, or acri-narcotics, as spirits of horseradish, tr. of squills, aconite, hellebore, or chelidonium, the latter in particular being exhibited in the smallest quantity; or by exciting the functions of the kidneys and capillary system, as by the oil of juniper, and other remedies of a similar description. The advantages hoped for from the eliminative treatment, by strong purgation with large doses of castor oil or rhubarb have, unfortunately, not been established by experience, though the theory of this peculiar method has been ably and succinctly demonstrated by its propounder, Dr. Johnson. From the earliest times of medical history, the benefit arising from the use of purgatives has been a subject of debate, and recent observation has only too amply shown how fallacious were the grounds upon which their employment was based. An

occasional revulsion, either by the primæ viæ, or otherwise, is, as all practical physicians will testify, often attended with unquestionably good results; but the resorting to a powerful mode of expulsion, through a channel already weakened by inordinate labour, and exposed to the constant influx of every kind of secretion from all points of the economy is, to say the least, hazardous in the extreme, or, where it happens to prove successful, must frequently become the source of a protracted local debility. Where the eliminative method is to be of use, it can only be made to be so in two ways, either by assisting to expel the *materies morbi* in the kindest and most genial mode, more with a view to awakening an expulsive tendency in the system, than by any active interference from without, or by creating a strong derivative action in some distantly related regions, the functions of which are temporarily heightened with the hope of relieving the organ affected. The former might be called the potential, the latter the material method; both have their decided merits, and, when judiciously employed, are in most cases attended with marked success. The remarks of Dr. Lionel Beale, in his 'Microscopical

Researches on the Cholera,' are quite in accordance with logical reasoning; that every morbid poison consists of living particles, and that these are subject to the various changes of growth and decay, attendant upon all matter imbued with vitality. Whether these minute particles, only visible under the highest diameters, represent the toxic agent, or whether it reside in a more subtle and intangible fluid, the former being merely the visible hold points of the latter, is simply a matter of speculation; it is quite clear, however, that the eliminative process, as generally understood, does not take place in the rough manner described by pathologists, but that the toxic fluid finds its way out of the body by a process of exosmosis, or subtle permeation, making its exit from the blood by all the tissues simultaneously, and not by any particular channel, as by the kidneys, skin or intestines. It is upon this assumption that all dynamic treatment is founded, and in operating rather upon the organic power than on the organic matter, the reduction of the dose should stop at the boundary where the material action ceases, and the potential action begins; a point of great practical moment, as

both exaggerately small and immoderately large quantities are apt to elude our calculation and confuse our diagnosis, either by distorting the picture of the malady, or by inducing us to trust too much to the efficacy of the remedy employed, which, in the former case, has done but little or nothing at all. As far as I have seen, the effects of bleeding have only been palliative; yet the older Indian physicians speak highly of it: it forms part of the eliminative treatment, and is decidedly preferable to the sthenic method so much in vogue.* Hot air baths, or the close packing, as under the hydropathic system, is by no means as efficacious as is generally believed; to force an elimination by the skin before the illness has been regularly overcome, either by the natural efforts, or the interposition of art, is erroneous in theory, and experience too amply proves how futile is this attempt; but what I am sometimes in the habit of doing is lightly to sponge over the body with cold water, to wrap the patient

* In one of the cases under my care, a prolonged sopor, which set in during reaction, and which had resisted all other means, immediately yielded to the application of a couple of leeches to the nostrils. The blood drawn was of that tarry consistence, so peculiar to the choleraic disease.

in dry blankets immediately after, and await the perspiration of the skin, which generally, in the lighter cases, comes on after a short time without much constitutional disturbance. The throwing up of warm water into the rectum, the injection of the same into the veins, either alone or in combination with some of the neutral salts, or the introduction of artificially prepared chyle into the circulation, can merely be regarded as so many interesting experiments, but are totally unable, from their exclusive mechanical or chemical tendency, to work any permanent good in the disease, to say nothing of the practical difficulties to stand in the way of their application, and the danger, more or less, attendant upon the transmission of an extraneous fluid into the blood. I can do no more than allude to Dr. Chapman's ingenious theory of restraining the hyperæmia of the cerebro-spinal axis and great sympathetic, by the application of ice to the spine; but though the inhibitory influence of cold over the vascular and nervous system, is well understood,—it is apt, if continued without interruption, to depress the vitality of the system too much, which,

once reduced beyond a certain point, is with great difficulty brought back to its normal standard, besides being like heat, galvanism, &c., too general in its character to have a specific or neutralizing effect upon any particular malady. The incipient cramps in the abdomen are occasionally allayed by the application of heat, or by gently rubbing the same with sweet oil. Turpentine stupes are decidedly injurious, by interfering with the secretion of the kidneys, the re-establishment or proper maintenance of which forms so important a point in the chances of recovery. From the introduction of a deleterious expansive vegetable element, in addition to the presence of the choleraic poison, stimulants are positively detrimental, besides which, owing to the absorbent function being all but suspended, they are scarcely received into the system, and what little finds its way into the circulation, rather hastens the direful termination of the disease than otherwise, by increasing the spasmodic contraction of the minute ramifications of the pulmonary arteries, thus favouring the dreaded stage of collapse, instead of averting the fatal consequences. I

cannot speak favourably of the employment of camphor; it often depresses the system to an alarming degree, and where it seems to do good, its effects are too volatile to be of any permanent avail. Opium, save in the slighter forms of diarrhœa, in any of its forms, seems rather to aggravate than to benefit the disorder; it potensates the ganglionic centres too much against the cerebro-spinal axis, and, moreover, operates as a check upon the natural secretions, which, in this instance, is particularly disastrous. Chlorodine, though greatly in vogue just now, is too complex a preparation to be safely recommended here, and though as a carminative it may do good in simple diarrhœa, its secondary effects upon the nervous system are often very unpleasant, and not easily shaken off. Astringents, whether alone or in combination with opium or chalk mixture are, of all anti-choleraic remedies, the most objectionable; they either do harm by producing a spurious local tonicity, where all is bent upon elimination, or, where this is not the case, they increase the evil by exciting the dejections beyond all medical control; in fact, the worst cases that ever came under my notice

were such, in which these remedies had been previously used. During convalescence, food and stimulants should be very sparingly administered, many instances of relapse occurring from the want of adopting this proper precaution. The subsequent protracted diarrhœa is best overcome by a mild tonic regimen. I found small doses of steel answer better than either bark or quinine, and I recommend, where procurable, the use of acorn-coffee for breakfast. Where low fever symptoms set in, the diluted phosphoric acid in small doses has generally stood me in good stead, and where there has been an excitable heart, with a quick fluttering pulse, the judicious allowance of wine has exercised a marked control over the circulation, and been followed by an immediate improval of the symptoms. No true specific against the cholera has as yet been found; the vegetative substances being too fugitive, and the mineral too rigid in character to yield the remedy required. Unfortunately the animal substances introduced into the *materia medica* are but few, and among these there are none that have a direct bearing upon the disease in question; prussic acid, musk,

castoreum, have severally been tried, but, from their having no predilection for the regions affected, or no decided affinity to the particular morbid poison, they failed to accomplish the end for which they were employed. What is urgently required, is a compound from the nitrogenous group, with a direct bearing upon the seat of injury, and possessing sufficient strength and stability to withstand the repeated inroads of the raging toxic element. Many experiments might be made in this direction among the nitrogen substitution compounds; but too little is, as yet, known of these highly explosive agents to warrant any more than a mere suggestion as to their employment. The internal administration of the more potent animal poisons has, I believe, never been attempted in the cholera, and it would be as profitable as interesting an undertaking to determine by scientific investigation, the relation they individually bear to this dread disease. In the absence of any specific in the cholera, I have endeavoured, as far as I was able, to trace out a general plan of treatment, based upon the most acknowledged physiological and pathological principles, and

have done so with the greater confidence, as, during the late epidemic of 1866, in which I took a particular interest, the adoption of the same has been attended with unusual success, for out of about fifty private cases, (some true Asiatic cholera) chiefly taken from the humbler classes, which came under my care, with symptoms more or less severe, not one succumbed to the illness.

It would be impossible to say which of the remedies alluded to would be likely to meet the requirements of each individual case, their selection entirely depending upon the idiosyncracy of the patient, and the peculiarity and virulence of the illness; the successful issue must therefore entirely depend upon the discrimination of the reflecting physician, who will be guided in his task by the extent of his judgment, and the facility he possesses of adapting the means at his disposal to the most profitable use.

THE END.