An essay upon pestilential diseases, such as the putrid, malignant, and yellow fevers, and the plague; with an account of an infectious fever, or plague, which broke out and raged with great mortality on board His Majesty's Ship Surprise, in the year 1776, on the Banks of Newfoundland; ... and upon the most effectual means of destroying contagion or infection, by quick-lime, and the fumes of the sulphuric acid.

AN

ESSAY

UPON

PESTILENTIAL DISEASES;

SUCH AS THE

PUTRID, MALIGNANT, AND YELLOW FEVERS, AND THE PLAGUE:

WITH

An Account of an INFECTIOUS FEVER, or PLAGUE, which broke out and raged with great Mortality on board His Majesty's Ship SURPRISE, in the Year 1776, on the Banks of Newfoundland: Upon the METHODS of PREVENTION and CURE: And especially upon the most effectual Means of DESTROYING CONTAGION, or INFECTION, by Quick-lime, and the Fumes of the Sulphuric Acid.

Together with Dr. CULLEN's Doctrine of Contagion, and the MEANS recommended by that celebrated Professor, for PREVENTING the SPREADING of INFECTION. Including Dr. J. C. SMYTH's METHOD of DESTROYING CONTAGION by the Fumes of the Nitrous Acid, &c.—in order to shew that the Fumes of the Vitriolic Acid are not only more powerful and more certain than the Fumes of the Nitrous Acid, for this purpose; but that the Fumes of burning Brimstone are the ONLY Means of destroying the Infection and Contagion of Epidemical Diseases.

LIKEWISE,

OCCASIONAL REMARKS upon the Effects of the Fumes of Sulphur upon Insects, Animalculæ, &c. with an infallible Method of destroying the Vermin which infest Apple-trees, causing the Canker, &c.

By JAMES RYMER, Surgeon, R. N.

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1805.

TO THE RIGHT HONOURABLE

WILLIAM PITT,

FIRST LORD OF THE TREASURY, CHANCELLOR OF THE EXCHEQUER, *&c. &c.*

SIR,

FROM the important and comprehensive purport of this Essay, I have been induced to take the liberty of dedicating it to you.

If there should be any thing pointed out in it which shall be found, in any measure, to be calculated to lessen the dreadful consequences of Pestilence, I trust, Sir, that it will meet with your hearty approbation and patronage.

I have the honour to be,

With the greatest Respect,

SIR,

Your most obedient, and

Most humble Servant,

JAMES RYMER.

Reigate, Feb. 28th, 1805.

AN ESSAY

UPON

PESTILENTIAL DISEASES,

&c.

At a time when peſtilence rages in various parts of the world, it is the duty of every man to come forward and publiſh whatever may contribute to allay, prevent, or remove, ſo grievous a calamity.

Having acquired ſome experience, as Surgeon of ſeveral of his Majeſty's ſhips, during a ſervice of upwards of ten years, in the treatment of infectious and contagious fevers; and having, ſince the year 1782, in practice both in London and the country, beſtowed much attention to the means of preventing and curing ſuch diſeaſes, I am in great hopes that what I ſhall ſubjoin will not be altogether uſeleſs.

From the year 1770 to 1774, I ſerved in my profeſſion, as Surgeon, on board his Majeſty's ſhips,

Montreal and Trident, in the Mediterranean ſtation. We paſſed that time at Gibraltar, Minorca, Villa Franca, Genoa, Leghorn, Naples, Smyrna, Milo in the Archipelago, Algiers, Cadiz, and Liſbon. The prevailing complaints, on board theſe ſhips, were ſuch as commonly occur in a healthy climate under all the favourable circumſtances of wholeſome proviſions, cleanlineſs, ventilation and fumigation; proper clothing, due hours of duty and reſt; temperance, and conſiſtent diſcipline.

Excepting ſome caſes of dyſentery, and the ſmall-pox, a few inſtances of the malignant quinſy, and ſcarlet fever, we very ſeldom had any fever of an infectious nature. In the ſpring of the year, the prevailing complaints were of the catarrhal and pneumonic kind; in the ſummer, we had hardly any illneſs; in the autumn, diarrhœa and cholera were not uncommon; and, in the winter, we had ſome caſes of the ſcarlet fever, and the malignant ſore throat.

In the Montreal, James Alms, Eſq. Commander, there being a war between the Ruſſians and the Turks, we ſpent ſome weeks at Smyrna, in the autumn of 1771, where the flaſhes of lightning were every night ſo univerſal and vivid, that we ſaw the

ſurrounding

ſurrounding mountains, and other objects, as diſtinctly as in day-light. The air here was in general very damp. The prevalent complaints were colds, rheumatiſm and lumbago, and other ſlight febrile affections.

All that I could gather here concerning the plague, was, that an infectious fever, commonly called the plague in theſe countries, happens now and then; that it prevails moſtly among the lower orders of the people; that it is propagated by infected perſons, articles of trade, &c. and that the filthy habits, and indolence, of the meaner ſorts, were alſo occaſional ſources of infection.

Body linen and clothes worn unchanged for a length of time, in ſuch climates, and ſaturated with ſweat and other animal exhalations, muſt naturally be productive of ſtench, and morbid effluvia; on the other hand, contagion apart, health is generally the companion of cleanlineſs.

In 1772, on board his Majeſty's ſhip Trident, Captain Ellis, bearing the flag of Admiral Sir Peter Dennis, Bart. we anchored in the roads of *Baja*, ſome miles ſouth of Naples, where we ſtaid about three months, ſurrounded by Nero's baths, the ruins of the ancient city of *Baja*, *Puzzuoli*, &c. From every

fiſſure of the earth, hereabouts, iſſued a ſulphureous ſmoke; the ſand and ſea-water at the ſhore were, in places, nearly at the boiling point of Farenheit's thermometer; and, in going aſhore to Puzzuoli, in the ſhip's boats, we could ſee under water the chimneys and walls of houſes—ruins of Baja, now overwhelmed by the ſea, occaſioned, many ages ago, by earthquakes—an awful, mournful ſight.—*Sic tranſit gloria mundi!*

From our anchorage in the roads of *Baja*, we had a fair view of Mount Veſuvius, pouring forth vaſt columns of denſe black ſmoke in the day; and in the night the appearance was that of flames and embers, and maſſes of red-hot ſtones and blocks, thrown up into the air.

Not far from *Baja* is the *Solfaterra*, a mountain, formely a volcano, into whoſe baſin or crater I deſcended, and obſerved at the bottom, towards the N. E. ſide, caverns, whence iſſued ſulphureous ſmoke and vapours; and around the mouths of many ſmaller openings, here and there, were cryſtallizations, like cluſters of rubies and topazes, of moſt beautiful arrangement and colour.

Upon enquiry at Naples and Puzzuoli, I underſtood that contagious fevers were rare and of ſhort duration;

duration; which bleſſings they attributed to the favour of *St. Januarius*, but which may be more rationally and ſcientifically aſcribed to one of the moſt powerful agents in nature, viz. the vitriolic acid volatilized, or in a ſtate of vapour, as it ariſes from the combuſtion or burning of ſulphur.

In the air of this country, which I conceive to be very healthy, we had ſcarcely one man upon the ſick liſt during our ſtay. Some of the men, who ſuppoſed themſelves troubled with chronic rheumatiſm, ſciatica and lumbago; and others, who had eruptions of the herpetic and ſyphilitic kind; went naked daily into one of Nero's baths, which are caves or excavations of a rocky promontory, conſtantly full of ſulphureous ſmoke and vapour, iſſuing from numerous fiſſures and apertures. Theſe men received much benefit from ſuch expoſure: and in particular I well recollect Lieutenant Samuel Graves, who had many copper-coloured blotches, and much ſcurf, upon his ſhoulders and arms. They went into theſe caves or baths with lighted candles in lanterns; notwithſtanding which, the ſteam was ſo denſe that they could hardly ſee any thing elſe. The temperature of this vapour was ſo high as to cauſe them to ſweat profuſely in a ſhort time.

When occaſions pointed out the propriety of fumigating the ſhip, ſtoves were placed, on ſhingle-ballaſt, between decks; and pieces of old rope, junk, and tobacco leaves, with ſome ſaltpetre and a few brimſtone matches, were ſet fire to, ſo as to make a ſmothering fire: the ſcuttles, ports, and hatchways, were then cloſed for an hour or two, when the fires were put out: but the ſcuttles, ports, and hatchways, were previouſly opened, to allow a ſufficient time for the diſperſion and eſcape of the ſmoke and ſulphureous vapour.

During the whole courſe of this ſtation, we had not one inſtance of the ſea-ſcurvy. But when it is conſidered, that the people had almoſt conſtant ſupplies of freſh meat, vegetables and fruit, and very often fermented or leavened bread; and that each man had a pint of wine ſerved to him daily; it would have been a wonderful event indeed, if that diſeaſe had at all made its appearance.

I ſpent great part of the year 1775 in the Weſt Indies, where nothing in particular occurred with reſpect to diſeaſe.

In January 1776, I was appointed Surgeon of his Majeſty's ſhip Surpriſe, Robert Linzee, Eſq. Commander. In March following, we were one of a

ſquadron

ſquadron under the command of Sir Charles Douglas, Bart. and ſailed from Plymouth Sound with tranſports and troops for the relief of Quebec, then beſieged by the Americans. This ſervice being performed, we ſailed from Quebec to Newfoundland, as one of the ſhips for the protection of the fiſhery there. From Plymouth Sound to Quebec, and from the latter place to Newfoundland, our ſhip's company had been very healthy.

Before I proceed further, it will be proper to conſider the origin and nature of contagion and miaſmata.

The learned and celebrated Dr. Cullen, in his Firſt Lines of the Practice of Phyſic, delivers himſelf upon this ſubject as follows:

"As fever has been held to conſiſt chiefly in an increaſed action of the heart and arteries, phyſicians have ſuppoſed its remote cauſes to be certain direct ſtimulants fitted to produce this increaſed action. In many caſes, however, there is no evidence of ſuch ſtimulants being applied; and in thoſe in which they are applied, they either produce only a temporary frequency of the pulſe, which cannot be conſidered as a diſeaſe; or, if they do produce a permanent febrile ſtate, it is by the intervention of a topical

inflammation, which produces a diſeaſe different from what is ſtrictly called fever.

"That direct ſtimulants are the remote cauſes of fever ſeems further improbable; becauſe the ſuppoſition does not account for the phenomena attending the acceſſion of fevers: and becauſe other remote cauſes can with greater certainty be aſſigned.

"As fevers are ſo generally epidemic, it is probable, that ſome matter floating in the atmoſphere, and applied to the bodies of men, ought to be conſidered as the remote cauſe of fevers: and theſe matters, preſent in the atmoſphere, and thus acting upon men, may be conſidered either as contagions, that is, effluvia ariſing directly or originally from the body of a man under a particular diſeaſe, and exciting the ſame kind of diſeaſe in the body of the perſon to whom they are applied; or *miasmata*, that is, effluvia ariſing from other ſubſtances than the bodies of men, producing a diſeaſe in the perſon to whom they are applied.

"It is now well known, that the effluvia conſtantly ariſing from the living human body, if long retained in the ſame place, without being diffuſed in the atmoſphere, acquire a ſingular virulence; and in that ſtate,

being

being applied to the bodies of men, become the cauſe of a fever which is highly contagious.

" The exiſtence of ſuch a cauſe is fully proved by the late Obſervations on Jail and Hoſpital Fevers; and, that the ſame virulent matter may be produced in many other places, muſt be ſufficiently obvious; and it is probable that the contagion ariſing in this manner is not like many other contagions, permanent and conſtantly exiſting; but that, in the circumſtances mentioned, it is occaſionally generated: at the ſame time, the nature of the fevers from thence upon different occaſions ariſing, renders it probable that the virulent ſtate of human effluvia is the common cauſe of them, as they differ only in a ſtate of their ſymptoms; which may be imputed to the circumſtances of ſeaſon, climate, &c. concurring with the contagion, and modifying its force.

" With reſpect to theſe contagions, though we have ſpoken of them as of a matter floating in the atmoſphere, it is proper to obſerve, that they are never found to act but when they are near to the ſources from whence they ariſe; that is, either near to the bodies of men, from which they immediately iſſue, or near to ſome ſubſtances, which, as having been near to the bodies of men, are imbued with their

effluvia,

effluvia, and in which ſubſtances theſe effluvia are ſometimes retained in an active ſtate for a very long time.

"The ſubſtances thus imbued with an active and infectious matter may be called *fomites*; and it appears to me probable, that contagions, as they ariſe from fomites, are more powerful than as they ariſe immediately from the human body.

"Miaſmata are next to be conſidered: they may ariſe from various ſources, and be of different kinds; but we know little of their variety, or of their ſeveral effects. We know with certainty only one ſpecies of miaſma which can be conſidered as the cauſe of fever; and, from the univerſality of this, it may be doubted if there be any other.

"The miaſma ſo univerſally the cauſe of fever, is that which ariſes from marſhes or moiſt ground, acted upon by heat. So many obſervations have now been made with reſpect to this, in ſo many different regions of the earth, that there is neither any doubt of its being in general a cauſe of fevers, nor of its being very univerſally the cauſe of intermittent fevers, in all their different forms. The ſimilarity of the climate, ſeaſon, and ſoil, in the different countries in which intermittents ariſe, and the ſimilarity of the diſeaſes, though ariſing in different regions, concur in proving

that

that there is one common cauſe of theſe diſeaſes, and that this is the marſh miaſma.

"What is the particular nature of this miaſma, we know not; nor do we certainly know whether or not it differs in kind; but it is probable that it does not, and that it varies only in the degree of its power, or perhaps as to its quantity in a given ſpace.

"It is now rendered probable that the remote cauſes of fevers are chiefly *contagions* or *miasmata*, and neither of them of great variety. We have ſuppoſed that miaſmata are the cauſe of intermittents, and contagions the cauſe of continued fevers, ſtrictly ſo named; but we cannot with propriety employ theſe general terms. For as the cauſe of continued fevers may ariſe from fomites, and may, in ſuch caſes, be called a miaſma; and as other miaſmata alſo may produce contagious diſeaſes; it will be proper to diſtinguiſh the cauſes of fevers, by uſing the terms *human* or *marsh effluvia*, rather than the general ones of contagion or miaſma.

"To render our doctrine of fever conſiſtent and complete, it is neceſſary to add here, that thoſe remote cauſes of fever, human and marſh effluvia, ſeem to be of a debilitating or ſedative quality. They ariſe from a putreſcent matter. Their production is favoured, and

their

their power increaſed, by circumſtances which favour putrefaction; and they often prove putrefactive ferments, with reſpect to the animal fluids. As putrid matter, therefore, is always, with reſpect to animal bodies, a powerful ſedative, ſo it can hardly be doubted that human and marſh effluvia are of the ſame quality; and it is confirmed by this that the debility which is always induced, ſeems to be in proportion to the other marks that appear of the power of thoſe cauſes."

We had been now upon the Newfoundland ſtation from the beginning of June till about the end of Auguſt, ſeldom in harbours, but generally cruiſing upon the banks, in ſuch denſe fogs, that, for the moſt part, we could hardly ſee the jib-boom from the quarter-deck; and the air ſo moiſt that all cold bodies expoſed to it were completely wetted by the condenſed vapour, which trickled down in drops from the cannon, &c. The people hitherto had enjoyed good health; but, about the beginning of September, a malignant fever of a peculiar virulence and fatality made its appearance. This occurrence was the more extraordinary, as we had not been expoſed to any infection or contagion whatever, either bodily, or by goods or things of any kind of a ſuſpicious nature. The uſual attention had been all along paid to the general rules

and

and regulations for the preſervation of health, excepting that the hammocks and bedding could not be well aired in ſo moiſt an atmoſphere. The people, in addition to the common run of ſea proviſions, had daily ſupplies of freſh codfiſh, which were caught in abundance. How, then, was the generation of this contagion to be accounted for? The only probable ſource muſt have been, the conjoint action of heat and moiſture, and the exhalations and effluvia of the men in their confined and damp ſituation between decks. Poſſibly, ſome of the people might have been generally filthy and negligent in changing their check ſhirts, &c. unknown to the officers.

It being of the utmoſt importance to aſcertain the origin of contagion, I ſhall, in this place, again quote from Dr. Cullen's Firſt Lines, his words concerning the ſpecific contagion of the dyſentery.

" The dyſentery does often manifeſtly ariſe from the application of cold; but the diſeaſe is always contagious; and by the propagation of ſuch contagion, independently of cold, or other exciting cauſes, it becomes epidemic, in camps and other places. It is, therefore, to be doubted, if the application of cold does ever produce the diſeaſe, unleſs where the ſpecific contagion has been previouſly received into the

body:

body: and, upon the whole, it is probable that a ſpecific contagion is to be conſidered as always the remote cauſe of the diſeaſe.

" Whether this contagion, like many others, be of a permanent nature, and only ſhews its effects in certain circumſtances which render it active, or if it be occaſionally produced, I cannot determine. Neither, if the latter ſuppoſition be received, can I ſay by what means it may be generated. As little do we know any thing of its nature, conſidered in itſelf; or at moſt this only, that, in common with many other contagions, it appears to be commonly of a putrid nature, and capable of inducing a putreſcent tendency in the human body. This, however, does not at all explain its peculiar power in inducing theſe ſymptoms, which properly and eſſentially conſtitute the diſeaſe of dyſentery."

The mere odour, or effluvia, from an animal body in a ſtate of putrefaction, which did not die of an infectious diſeaſe, will not induce any putreſcent tendency in the living body; but if the putrid matter of a dead body, under ſuch circumſtances, were applied to a freſh puncture or wound, as in the caſe of inoculation for the ſmall-pox, a virulent putrid fever would, in all probability, be the conſequence. The putrid ferment,

thus

thus applied, would be abſorbed into the circulating ſyſtem, and prove deleterious. The late ingenious and indefatigable anatomiſt, Mr. Faulkner, of Craven-ſtreet, Strand, by cutting a finger when diſſecting a putrid body, was ſoon thereafter ſeized with a malignant fever, which ended fatally in a few days.

I recollect a ſaying of the late Dr. William Hunter's, when I attended his lectures upon Anatomy, many years ago. The Doctor was delivering his lecture to a crowded audience, having a putrid and very offenſive body upon the table before him; and obſerving ſeveral of his pupils putting their handkerchiefs to their noſes, the Doctor ſaid, Gentlemen, you need not be afraid, there is no harm in this ſmell: for my own part, I have always found ſuch odours quite refreſhing.—However true this might have been (and I cannot ſuppoſe that ſo correct a man, as Dr. Hunter was, would treat ſo grave a ſubject with levity), I am of opinion, that if dead bodies for anatomical purpoſes underwent proper ablution in quick-lime and water, whereby all putreſcent ſlime and other noxious matter would be removed, the danger, upon diſſection, would be leſſened. Quick-lime in ſuch caſes is powerfully antiſeptic; that is, by its cauſticity it effectually changes the nature of putrid animal matter, rendering it inert

and

and harmleſs; or, in other words, putrid animal matter is decompoſed by quick-lime. Clothes and bedding, &c. imbued with infectious effluvia, ſhould be firſt fumigated with the vapour of burning brimſtone; and, after a due time, ſcoured in quick-lime and water, and then hung out in the open air, to dry. By ſuch precautions, much ſerious miſchief would be prevented.

It is probable that, for ſimilar reaſons, in Spain, the South of France, and in Italy, they bury their dead in quick-lime. Being one day in the principal church of Port-Mahon, in Minorca, I obſerved a circular *grating* in the center of the floor of the church; and, upon enquiring the uſe of it, was told that the dead bodies were let down through this opening into the vault underneath, which contained quick-lime, in order to the ſpeedy deſtruction of the ſoft parts of the bodies, and to prevent infection. Upon this occaſion it is proper to remark, that, unleſs the quick-lime be frequently and occaſionally renewed, theſe ends will not be obtained. Quick-lime, by expoſure to the open air, loſes its cauſticity, crumbling into ſmall particles by abſorbing or combining with the aëreal acid and watery vapour, whereby it is converted into its former or original ſtate of calcareous earth; and in this

condition

condition it is called ſlaked lime; which may be again changed into quick-lime by a ſecond calcination, in which proceſs, fixed air, which conſtitutes about one-third of the weight of lime-ſtone or chalk, is extricated.

But, to return:—The diſeaſe, as I obſerved above, which broke out on board his Majeſty's ſhip Surpriſe in the beginning of September, was of ſuch a character as I had never met with before. The two principal ſymptoms upon the attack, were,

1ſt. Extreme debility of the mental, vital, and animal functions. The patients ſtaggered like drunken men, and often fell down in fainting fits.

2dly. Sudden and profuſe hæmorrhage from the noſe. They alſo, in the beginning of the diſeaſe, complained of ſtupor, head-ach and giddineſs, with faintneſs, ſickneſs at ſtomach, vomiting, and ſometimes, purging. The countenance of the freſh-coloured, was livid and ſhrunk; of others pale and cadaverous. Some had ſudden fluſhings, which as ſuddenly diſappeared, leaving the whole countenance ſhrivelled and of a death-like whiteneſs, with tremulous lips and chattering of the teeth, upon which they ſhivered univerſally with ſenſations of extreme cold. The whole muſcular ſyſtem, including the

heart and arteries, ſeemed to be almoſt deprived of their powers; the debility being ſo great and univerſal. The pulſe was irregular and intermittent; alternately ſmall, quick, and thready; ſtrong, full, and hard. The delirium, which in all ſoon took place, was ſeldom fierce, generally mild; and the *sensorium commune* rather comatoſe. In the progreſs of the diſeaſe, livid and black-coloured ſpots and blotches appeared upon various parts of the body. The tongue was black and tremulous. The thirſt was not very urgent. The eyes were dull and dejected. In general, the diſeaſe terminated fatally on the ſecond and third day from the ſeizure; and ſome, even of the ſtrongeſt men, died in about twenty-four hours; ſo virulent and deadly was the nature of this peculiar contagion.

I treated this peſtilential fever as follows. Immediately upon the attack I gave an emetic, and after its operation, if no ſtools ſoon followed, a purge of powder of jalap and calomel. And, after the operation of this purgative, I adminiſtered the bark every hour, every ſecond hour, and every third hour, according as the ſtomach bore it, and as patients could be prevailed upon to take it, in the quantity of from half to a whole drachm of the powder mixed in two ounces of port wine, together with from ten to fifteen

drops

drops of the elixir of vitriol, during the day. At night, on the ſecond day from the attack, I gave each patient, whoſe ſtomach could bear it, from ſeven to ten grains of Dr. James's fever powder; and I found that whenever this medicine produced *diaphoresis* or ſweating, which it commonly did, it was of great ſervice in moderating the delirium, and the deranged action of the heart and arteries. But after vomiting, purging, and ſweating, my chief hopes were in the antiſeptic and cordial virtues of the bark, wine, and elixir of vitriol.

Inſtead of James's powder, to thoſe whoſe ſtomachs would hardly retain any medicine, I gave a draught compoſed of half an ounce of Mindererus' ſpirit, two drachms of paregoric elixir, two ounces of barley-water, and a little ſyrup, with excellent effect, every hour, till the draughts produced a copious ſweating.

In the courſe of this month, we loſt many men; and it was no uncommon occurrence to ſee three or four dead bodies committed to the deep, daily.

About this time I met with a heavy misfortune. My mate failed with the fever. His activity, diligence, and humanity, had been conſpicuous and deſerving of every praiſe during our ſevere affliction. I treated him as above ſtated, and he had the good fortune to

recover, and was able to reſume his duty in about ten days.

Water-gruel, rice-gruel, and ſago, with ginger or mace, or nutmeg and ſugar, were the common drinks, and indeed nouriſhment, in the diſeaſe.

To overcome the ſtench and offenſive vapours in the ſick birth, the ſteam of boiling vinegar, and camphire previouſly diſſolved in a little rectified ſpirit of wine, were uſed: and by the frequent burning of a brimſtone match, ſo as not to offend reſpiration, I am convinced that great beneficial effects reſulted. We perſevered in thoſe means till our arrival at Spithead, in November, when all the ſick on board were ſent to Haſlar hoſpital. The ſhip was then fumigated, not only in the accuſtomed way of the navy, but with the fumes of burning brimſtone, and waſhed between decks with quick-lime and water, which, altogether, were productive of the moſt happy effects.

Our method of fumigating was this: a ſhip's ſtove was placed in each bay or ſick birth, having combuſtible articles properly arranged, viz. bits of old rope, junk, cannon matches, ſlips of deal board, and ſhreds of coarſe linen or canvaſs, incruſted with ſulphur by dipping them in melted brimſtone: and one or two more of the ſame ſtoves were placed between decks,

with

with the ſame materials. As ſoon as the fires were lighted, and all the men upon deck, the ſcuttles were ſhut, and all the gratings of the hatchways covered with tarpaulins, to confine the ſmoke and fumes. In the courſe of an hour or two, the ſcuttles and hatchways, being previouſly opened, and due time given for the diſſipation of the ſulphuric vapours, the people went below to extinguiſh the remaining embers in the ſtoves, &c. The chief precaution, in fumigating with brimſtone, is carefully to avoid inhaling or breathing or inſpiring the fumes ariſing from the burning matters. When they are diffuſed in the air, and ſo diluted therein as not to be in anywiſe ſuffocating, no inconvenience will happen to any one, though the lungs be ever ſo irritable and tender.

That the reader may be enabled to judge how far the above diſeaſe was analogous to the plague, I ſhall here insert the ſymptoms of the latter, as enumerated by Dr. Cullen, in his Firſt Lines.

" 1ſt, The great loſs of ſtrength in the animal functions, which often appears early in the diſeaſe.

" 2dly, The ſtupor, giddineſs, and conſequent ſtaggering, which reſembles drunkenneſs, or the headach, and various delirium; which are all of them

ſymptoms denoting a great diſorder in the functions of the brain.

" 3dly, The anxiety, palpitation, and ſyncope, and eſpecially the weakneſs and irregularity of the pulſe, which denote a conſiderable diſturbance in the action of the heart.

" 4thly, The nauſea and vomiting, particularly the vomiting of bile, which ſhews an accumulation of vitiated bile in the gall bladder and biliary ducts, and from thence derived into the inteſtines and ſtomach; all of which ſymptoms I ſuppoſe to denote a conſiderable ſpaſm and loſs of tone in the extreme veſſels on the ſurface of the body.

" 5thly, The buboes or carbuncles, which denote an acrimony prevailing in the fluids. And,

" Laſtly, the petechiæ, hæmorrhages, and colliquative diarrhœa, which denote a putreſcent tendency prevailing to a great degree in the maſs of blood."

If the above ſymptoms of the plague, from Dr. Cullen, be compared with the ſymptoms of the diſeaſe which raged ſo fatally on board the Surpriſe, there can be no doubt but that it was of the nature of the plague. Excepting the fifth ſymptoms of Dr. Cullen, viz. buboes or carbuncles, all the others coincide

with

with our diſeaſe. We had no abſceſſes or impoſthumations. Upon the whole, it may be concluded, that our contagion was one of a moſt putreſcent, deleterious, malignant, and narcotic, nature.

My health having ſuffered by the anxiety and fatigue conſequent of our late ſickneſs on board his Majeſty's ſhip Surpriſe, I took the liberty of repreſenting the ſame to the Honourable the Commiſſioners of the Navy, humbly requeſting an appointment to ſome ſhip upon the home ſtation, with a view to the re-eſtabliſhment of my health. They had the goodneſs to liſten to my requeſt, and appointed me ſurgeon of his Majeſty's ſhip Alderney, William Webſter, eſq. commander, upon the North Sea ſtation, the rendezvous of which was Yarmouth Roads.

I continued upon the above ſtation till the ſpring of 1778, when I was appointed ſurgeon of his Majeſty's ſhip *Conquestador*, Samuel Thompſon, eſq. commander, having Admiral Campbell's flag flying, as commander in chief of his Majeſty's ſhips and veſſels in that quarter.

On board the Alderney, nothing medical occurred worthy of notice. But the Conqueſtador being a guardſhip for the reception of volunteers and impreſſed men for his Majeſty's navy, we were often expoſed to

infection, by various miſerable volunteers from London. Many of theſe unfortunate perſons were what are commonly called "*jail birds*," ſo ſqualid and offenſive as to require immediate ſtripping, and ablution in quick-lime and water; when, being well ſcoured and dried, by rubbing them with dry cloths, they were furniſhed with clean new ſhirts; comforts which they had not, probably, enjoyed for months before. They were, moreover, provided with new jackets, trowſers, ſtockings, and ſhoes; their old garments being carefully committed to the deep by ſinking them with ballaſt. Notwithſtanding theſe precautions, fevers, apparently of an infectious nature, ſometimes appeared. But, as the nature of the ſervice required that ſuch patients ſhould not remain on board, they were ſpeedily removed to the hoſpital ſhip at Sheerneſs. By repeated fumigation, ventilation, and other attentions to the preſervation of health, this ſhip was, upon the whole, remarkably healthy.

In the winter of 1779, Captain Thompſon was appointed commander of his Majeſty's ſhip America; and there being a vacancy in that ſhip for ſurgeon, he did me the honour to requeſt the Commiſſioners of the Navy to appoint me to fill it. Having obtained my warrant, I joined that ſhip accordingly, in Portſmouth harbour,

where

where ſhe was then fitting out for the North-America ſtation.

That I may not intrude upon the reader, I ſhall briefly ſtate that, ſhortly thereafter, we joined a ſquadron of five ſhips of the line in Plymouth Sound, under the command of Admiral Graves, in the London, and ſailed from thence, in March, for New York.

The only occurrence worth mentioning, on board the America, and, indeed, on board all the other ſhips of this ſquadron, was, that the ſea ſcurvy broke out and, raged with great violence, after we had been about three weeks at ſea; when our ſtock of freſh meat, vegetables, and ſmall beer, being exhauſted, the people were put upon the uſual ſea diet of ſalt beef and pork, ſalt butter, cheeſe, *burgoo*, peaſe ſoup; and grog, or rum and water, for drink. The ſea ſcurvy being a diſeaſe of the blood, wherein one of its conſtituent parts, the coagulable lymph, gluten, or *crassamentum*, gradually and almoſt totally diſappears *, in conſequence of a ſudden and eſſential

* Whence hæmorrhages, extravasations, ſuffusion, &c. symptoms ſo very different from those attending that state of blood which occurs in that order of diseases, called Phlegmasiæ, or inflammations, in Dr. Cullen's Nosology; in which the buffy coat, or inflammatory crust, ſo much abounds.

change

change of food and drink, it was in vain that we attempted the cure by any galenical or chemical means then in our poſſeſſion *. Many men were carried off by this diſeaſe on the paſſage to Sandy Hook. Upon our arrival we proceeded up the river, and anchored off Staten Iſland, where the ſick were landed and lodged in tents, and put upon a diet of freſh beef, leavened or fermented bread, vegetables and fruit, and good malt liquor, which cured them all in a rapid manner.

It is worthy of remark that the ſuperior officers of all the ſhips of this ſquadron, having had a ſufficient ſtock of ſheep, hogs, and poultry, wine and malt liquors, entirely eſcaped the diſeaſe.

I ſhall now proceed to the main object of this publication, namely—the moſt effectual means of deſtroying the infection or contagion of epidemical diſeaſes.

I am not only concluſively of opinion, but convinced, that the vitriolic acid, in a volatile ſtate, effectually deſtroys every ſpecific human contagion. The vitriolic acid, in its fixed ſtate, burns, conſumes, or

* If the reader desires particular information of this voyage, and upon this disease especially, he is respectfully referred to the author's "Chemical Reflections upon the Scurvy of Mariners."

decompoſes,

decompoſes, every animal and vegetable ſubſtance with which it is in contact. The vitriolic acid, volatilized by the combuſtion of ſulphur in the open air, is infallibly deſtructive of every ſpecies and variety of inſects and animalculæ. The fumes of the vitriolic acid, as ſet at liberty by the burning of brimſtone, are ſo ſubtile, penetrating, and powerful, as to render inert and harmleſs the moſt active effluvia of human bodies. Indeed, nothing organized, floating in the air, (and I do conceive all infections and contagious atoms to ſubſiſt in ſome ſuch form) however minute, of an animal or vegetable nature, can poſſibly withſtand their effects.

The power of this univerſal agent will be readily acknowledged, from a view of ſome of its more familiar effects. Is it required to deſtroy the bees in a hive, expoſe them to the vapours of burning brimſtone, and they will be inſtantly killed. Do you wiſh to deſtroy the *ova* or eggs of inſects, or the inſects themſelves, upon vegetables, ſhrubs, trees, &c.—it may be quickly accompliſhed by the proper application of the ſulphuric fumes. In this way, bugs, and vermin of all kinds, as well as mice and rats, may be got rid of. The itch, which is a diſeaſe of the ſkin, occaſioned by animalculæ, is effectually cured by the vitriolic acid

mixed

mixed with hogs-lard; or by an ointment compoſed of ſulphur and lard; when the vitriolic acid of the ſulphur acts upon the inſects in the puſtules, and kills them.

The apple-trees in this place and neighbourhood are generally liable to the canker. The ſubſtratum of our light ſoil is ſand. The gardeners ſay that when the roots of the trees penetrate this bed of ſand, the canker appears. For ſome years back, I have obſerved numerous patches upon my apple-trees, like a white mildew, or rather of a downy and mealy appearance. Laſt ſummer, I had the curioſity to examine them particularly. I bruſhed off the down or meal from patches, and obſerved underneath the ſame hordes of inſects, devouring the bark of the tree down to the wood. I immediately concluded that ſuch vermin ought to be deſtroyed. It was not convenient to apply the fumes of burning brimſtone to them all; I therefore contrived an ointment, conſiſting of one part of the flowers of ſulphur and two parts of hogs-lard, made by melting the lard in an earthen pipkin, and then mixing the flowers of ſulphur therewith by ſtirring it with a painter's bruſh. When this ointment was ſo far cooled as to be of the conſiſtence of paint or honey, but not ſtiffer, I gave each patch a good

doſe

doſe of the ſame with the painter's bruſh, working it well into the patches and crevices. The vermin were thereby completely deſtroyed. Nothing was afterwards to be ſeen but the yellow dawbs of the ointment, which, of courſe, I ſuffered to remain.

With reſpect to contagion, we have a deciſive proof of the power of the fumes of burning brimſtone in deſtroying its activity, in the inſtance of the variolous matter being rendered inert by due expoſure thereto. The matter of the ſmall-pox, in what may be called its condenſed or fixed ſtate, as taken from a puſtule, being duly expoſed to the action of the ſulphuric vapour, will not communicate the diſeaſe by inoculation: and it is highly probable that the volatile particles of the variolous contagion floating in the air of chambers, &c. would be rendered harmleſs by the action of the vitriolic fumes. As thoſe fumes inſtantaneouſly combine with, and neutralize, whatever atoms of an animal nature are expoſed to them, is it not probable that the volatilized vitriolic acid would deſtroy the matter of human contagion, whether in a fixed or volatile ſtate? fixed, as condenſed upon clothes, bedding, furniture, or goods of any kind; or volatile, as diffuſed in the air, &c.

I not only ſuppoſe the fumes of burning ſulphur to

be

be a certain antidote of human contagion, but alſo of the ſecond kind of infection, viz. marſh *miasmata*, or thoſe effluvia ariſing from the ſtagnation and putrefaction of vegetable matters in marſhy grounds, &c. producing intermittent fevers or agues, wherever it might be neceſſary and practicable to apply this antidote in ſufficient quantity and extent.

Upon the above grounds it is, that contagious diſeaſes happen ſo rarely in cities, where the general fuel conſiſts of pit-coal, which abounds with a kind of pyrites or ſulphureous combinations. It is obſerved of London, in Brookes's Gazetteer, "that the common firing is pit-coal, commonly called ſea-coal, of which there is conſumed upwards of 600,000 chaldrons every year. This renders the air groſs, but then it has a ſalutary effect in preſerving the city from peſtilential diſtempers; and the ſame has been obſerved of ſome cities in Germany; whereas, when wood was the chief fuel, the plague returned every ten years."

Dr. Watſon, in his chemical eſſays, ſays, "though the reader may have never contemplated the various ſpecies of the pyrites, in any cabinet of natural hiſtory, or taken notice of ſuch kinds as are commonly to be met with in chalk-pits, in beds of clay, or upon the

ſea-

ſea-ſhore in many places of England, yet the yellowiſh matter often adhering to, or mixed with pit-coal, cannot ſurely have eſcaped his obſervation; that matter conſiſts of ſulphur and iron."

In coal-pits there are layers of pyrites in the form of ſlate; a piece of which, being broken, has a ſtriated, needle-like, and metalline appearance; and, being put into a briſk fire, it burſts, with loud exploſions, into fragments, ſcattering all around bright ferruginous ſparks, and diffuſing a ſtrong ſulphureous ſmell.

The chimneys of London may be conſidered as a congeries, or collection of volcanos in minature, whoſe ſmoke and ſulphureous fumes, in the aggregate, muſt be greatly corrective of the putrid and noxious exhalations aſcending and floating in its atmoſphere.

If brimſtone, then, ſhall be adopted as an antidote of human contagion, and of which I can hardly entertain the ſlighteſt doubt, it will be attended and recommended by every favourable circumſtance. Brimſtone, that common, but wonderful ſubſtance, that mineral phoſphorus, is to be procured in abundance in all countries, and may be purchaſed everywhere at a cheap rate.

From a review of the effects of ſulphur, in actual combuſtion,

combuſtion, upon living creatures, it may be naturally ſuppoſed that much ſkill and addreſs will be required in its uſe and application as a fumigation; but I do apprehend that common attention only is neceſſary. Any ſteady, intelligent perſon, may be employed in this reſpect. The chief precaution, as has already been obſerved, conſiſts in avoiding the fumes ariſing from the burning matter. I mean, that the perſon holding a burning brimſtone match, for example, muſt not breathe or inſpire the ſmoke or fumes thereof, which are of ſuch a ſuffocating nature as to cauſe inſtant death when drawn into the lungs in ſufficient quantity. The moſt convenient, and indeed the ſafeſt form, will be that of matches, which ought to be made of thin ſlips of deal-board, about ſix inches in length, and dipped, at both ends, into the melted brimſtone, ſo as to be coated or incruſted therewith about an inch at each end. If it be required to fumigate a ſick chamber, let a match or matches be burnt juſt ſo frequently as to impregnate the air thereof ſenſibly with the ſulphureous ſmell, and of ſuch ſtrength only as not to offend very much or oppreſs the lungs, in breathing. The power of the fumes may be thus regulated with the utmoſt preciſion and ſafety. Where it is required to fumigate infected apartments,

(in which no perſons are to remain) clothes, bedding, goods, &c. matches, in due quantity, and properly arranged, may be ſet fire to, in ſtoves or other appropriate veſſels, either ſuſpended from the cielings, or placed at ſuch heights from the floor as may enable the perſon or perſons kindling the fires to get away before the fumes ſhall have accumulated in ſuch quantity and power as to be dangerous to reſpiration. During this burning of brimſtone, every opening of the room ſhould be cloſed, to prevent the eſcape of the fumes, for a reaſonable time. The ingenuity, experience, and judgment, of individuals, will naturally ſuggeſt ſuch other ways of fumigation with burning brimſtone as may be thought proper, applicable, and expedient.

Doctor I. C. Smyth, in his valuable work upon the jail diſtemper, and the means for deſtroying the contagion thereof, namely, by the nitrous acid in a ſtate of vapour, has the following words, with reſpect to the ſulphureous acid:

"The well known efficacy of the ſulphureous acid, in deſtroying contagion, is a ſufficient reaſon for our continuing to uſe it as a fumigation for clothes, furniture, &c. The nitrous acid, being attended with no riſk or inconvenience to the reſpiration, and ap-

pearing, from *our* experience, of ſufficient efficacy to prevent the farther ſpreading of contagion, ſeems the proper antidote to be applied in all ſituations where perſons are neceſſarily preſent; and is, in ſhort, the *desideratum* ſought after by the benevolent Dr. Lind.

" For purifying empty hoſpital or priſon wards, and ſhips, I ſhould alſo prefer the nitrous acid to the ſulphureous, as *I believe* it to be equally efficacious; its vapour is more volatile and penetrating; and it does not leave the diſagreeable ſmell which ſulphur does. But, for this particular object, I think it would be adviſable to make trial alſo of the marine acid, and of the mixture of the nitrous and marine acids; as I am convinced of the efficacy of all the mineral acids, for deſtroying contagion; and *our* experience *is not yet ſufficient* to determine *their* relative advantages and diſadvantages."

While I, in common with the public, allow Dr. Smyth to be highly deſerving of the honours beſtowed upon him for his labours in this field; yet, upon peruſal of the above paragraphs, the firſt emotions in the mind of the reader may lead him to aſk,

1ſt. If the ſulphureous acid be well known to be effectual in the deſtruction of contagion, as a fumi-

gation

gation for clothes, furniture, &c. will it not be equally efficacious in deſtroying contagion in the chambers of the infected?

If the fumes of ſulphur can deſtroy contagion in its condenſed or fixed ſtate, in furniture, and ſecreted and confined in clothes, goods, &c. how much more and immediately active muſt they be upon infectious particles expoſed thereto in the open air, where nothing intervenes to obſtruct their inſtant action? The conſideration of riſk and inconvenience ought to be entirely laid aſide where we have to contend with ſo formidable an enemy as the plague. In every arduous conteſt there will be riſk and inconvenience; but, where the means are anſwerable to the end, and where we are ultimately ſure of ſucceſs, it would ſurely be trifling with one of the moſt dreadful of all phyſical evils, if we forbore to attack it with all our might.

2dly. Why we ſhould relinquiſh a well-known and efficacious remedy, for one leſs known, leſs efficacious, leſs powerful, and leſs eſtabliſhed? The vitriolic acid is the moſt powerful of all the acids, mineral and vegetable, and decompoſes every combination by other acids, diſlodging them, and occupying their places with their baſes, forming, therewith, new and different

compounds. Upon this principle it is that Dr. Smyth ſets at liberty the nitrous acid from its baſe, by adding the vitriolic acid to nitre. His words upon this ſubject are:

"To obtain the nitrous or marine acid, in a ſtate of vapour, the method is extremely ſimple. It conſiſts in decompoſing nitre or common ſalt by means of heated vitriolic acid, which may be done as follows:

"Put half an ounce of vitriolic acid into a crucible, or into a glaſs or china cup, or deep ſaucer; warm this over a lamp or in heated ſand, adding to it, from time to time, ſome nitre or common ſalt: theſe veſſels ſhould be placed at twenty or thirty-feet diſtance from each other, according to the height of the cieling, or virulence of the contagion. In hoſpitals, or priſons, the lamps or veſſels containing heated ſand may be placed on the floor; on board ſhips, it will be better to hang them to the cieling by waxed threads."

The above method of decompoſing nitre or common ſalt by the vitriolic acid is correctly ſcientific, and agreeable to the rules and principles of chemiſtry; but ſome readers may not be aware that the nitrous acid is, of its own nature, volatile in the common

temperature

temperature of the air. Maquer, in his excellent book on the theory and practice of chemiſtry, ſays, "If the nitrous acid be dephlegmated, or contain but little ſuperfluous water, it exhales in reddiſh vapours; theſe vapours, being condenſed and collected, form a liquor of a browniſh yellow, that inceſſantly emits vapours of the ſame colour, and of a pungent, diſagreeable ſmell. Theſe characters have procured it the name of *ſmoking ſpirit of nitre*, &c. This property in the nitrous acid, of exhaling in vapours, ſhews it to be leſs fixed than the vitriolic acid; for the latter, though ever ſo thoroughly dephlegmated, never yields any vapours, nor has it any ſmell."

From the above extract it appears that if a ſmall quantity of the dephlegmated nitrous acid, ſay half an ounce, were poured into each crucible, glaſs, china cup or ſaucer, placed in veſſels containing heated ſand, or not, every purpoſe, it is preſumed, would be anſwered as well as by the proceſs ſo ſcientifically recommended by Dr. Smyth, wherever the fumes of the nitrous acid are required to be uſed as an antidote of contagion.

The learned and benevolent Dr. Buchan, upon the ſubject of the infection of fevers, in his valuable and

deſervedly popular work, *Domestic Medicine*, makes uſe of the following words:

"The clothes, bedding, &c. of the ſick ought to be carefully waſhed, and fumigated with brimſtone. Infection will lodge a long time in dirty clothes, and afterwards break out in the moſt terrible manner." With all due deference to this reſpectable phyſician, upon the above I have only to recommend that the clothes, bedding, &c. of the ſick, ought firſt to be fumigated with the fumes of burning brimſtone, and afterwards carefully ſcoured in quick-lime and water, and then hung out in the open air to dry.—Upon a ſubject of ſuch vaſt importance as the prevention of epidemical fevers, eſpecially the plague, I hope I ſhall ſtand excuſed for laying before the reader, the means recommended by Dr. Cullen, in his Firſt Lines.

"With reſpect to the prevention: as we are firmly perſuaded that the diſeaſe never ariſes in the northern parts of Europe, but in conſequence of its being imported from ſome other country; ſo the firſt meaſure neceſſary, is the magiſtrates taking care to prevent the importation: and this may generally be done by a due attention to bills of health, and to the proper performance of quarantine.

"With

" With reſpect to the latter, we are perſuaded that the quarantine of perſons may ſafely be much leſs than forty days; and if this were allowed, the execution of the quarantine would be more exact and certain, as the temptation to break it would be in a great meaſure removed.

" With reſpect to the quarantine of goods: it cannot be perfect, unleſs the ſuſpected goods be unpacked and daily ventilated, as well as the other means employed for correcting the infection they may carry: and, if all this were properly done, it is probable that the time commonly preſcribed for the quarantine of goods might alſo be ſhortened.

" A ſecond meaſure, in the way of prevention, becomes requiſite, when an infection has reached and prevailed in any place, to prevent that infection from ſpreading into other places. This can be done only by preventing the inhabitants, or the goods of any infected place, from going out of it, till they have undergone a proper quarantine.

" The third meaſure for prevention, to be employed with great care, is to hinder the infection from ſpreading among the inhabitants of the place in which it has ariſen. We infer, that all perſons who can

avoid any near communication with infected perſons, or goods, may eſcape infection.

" For avoiding ſuch communication, a great deal may be done by the magiſtrate, 1, By allowing as many of the inhabitants as are free from the infection, and not neceſſary to the ſervice of the place, to go out of it. 2, By prohibiting all aſſemblies, or unneceſſary intercourſe, of the people. 3, By taking care that neceſſary communications be performed without contact. 4, By making ſuch arrangements and proviſions as may render it eaſy for the families remaining, to ſhut themſelves up in their own houſes. 5, By allowing perſons to quit houſes in which an infection appears, upon condition that they go into lazarettos. 6, By ventilating and purifying, or deſtroying at the public expence, all infected goods. Laſtly, by avoiding hoſpitals, and providing ſeparate apartments for infected perſons,

" Of thoſe obliged to remain in infected places, but not obliged to have any near communication with the ſick, they may be preſerved from the contagion by avoiding all near communication with other perſons or their goods; and it is probable that a ſmall diſtance will anſwer the purpoſe, if at the ſame time

there

there be no ſtream of air to carry the effluvia, of perſons or goods, to ſome diſtance.

" The bodies of men are eſpecially liable to be affected by contagion, when they are anywiſe conſiderably weakened by want of food, and even by a ſcanty diet or one of little nouriſhment; by intemperance in drinking, which, when the ſtupor of intoxication is over, leaves the body in a weakened ſtate; by exceſs in '*animal appetites*;' by great fatigue; or by any conſiderable evacuation.

" A full diet of animal food increaſes the irritability of the body, and favours the operation of contagion; and indigeſtion, whether from the quantity or quality of food, has the ſame effect.

" Beſides giving attention to obviate the ſeveral circumſtances which favour the operation of contagion, it is probable that ſome means may be employed for ſtrengthening the bodies of men, and thereby enabling them to reſiſt contagion.

" For this purpoſe, it is probable that the moderate uſe of wine, or of ſpirituous liquors, may have a good effect.

" It is probable that ſome medicines alſo may be uſeful in enabling men to reſiſt infection: but amongſt

theſe

theſe I can hardly admit the numerous alexipharmics formerly propoſed; or, at leaſt, very few of them, and thoſe only of tonic power. Amongſt theſe laſt we reckon the Peruvian bark; and it is, perhaps, the moſt effectual. If any thing is to be expected from antiſeptics, I think camphire, whether internally or externally employed, is one of the moſt promiſing.

"It would probably contribute much to check the progreſs of infection, if the poor were enjoined to make a frequent change of clothing, and were ſuitably provided for that purpoſe; and if they were, at the ſame time, induced to make a frequent ventilation of their houſes and furniture." —— Thus far Dr. Cullen.

With reſpect to medicines for ſtrengthening the bodies of men, and thereby enabling them to reſiſt the operation of infection, it is with the utmoſt ſatisfaction that I can, with confidence, recommend one, of my own invention and preparation.

By reports, from various parts of the world, of the good effects of that patent medicine, the Cardiac and Nervous Tincture, as a preventive of infectious fevers, it appears that this medicine has been uſed with the greateſt ſucceſs by perſons expoſed to contagion in the

the Weſt Indies and America: and, from my own experience, I can confirm ſuch teſtimonies, and fairly aſſert that it is a moſt powerful tonic and antiſeptic, and at the ſame time it is gently aperient. To my own certain knowledge, it has met with great approbation during many years paſt, not only by moſt of the faculty, who keep it conſtantly in their ſhops for occaſional preſcription, but by perſons who had occaſion to take it in their avocations in the criminal courts of theſe kingdoms.

The doſe of this medicine, as a preventive, where perſons are conſtantly expoſed to the infection of fevers, is from one to three tea-ſpoonfuls in a glaſs of cold water, or wine, faſting, at noon; and at ſix in the evening. But, for occaſional purpoſes, the ſame quantities may be taken before breakfaſt and dinner only, and as pointed out in the pamphlets of directions.

Of the good effects of this medicine in *typhus* or putrid and malignant fevers, the following is one of many inſtances:

Extract

Extract from RYMER'S TRACT *on Dyspepsy, &c. 5th edition.*

CASE LI.—TO THE FACULTY.

MALIGNANT FEVERS.

That the following important Fact may be more generally known, Mr. Rymer thinks it his duty to publish it.

OF THE EFFECTS OF THE CARDIAC TINCTURE IN MALIGNANT FEVERS.

Very lately, in some cases of the *typhus nervosus, typhus putridus,* or the slow, nervous, putrid, malignant, petechial fever, I had remarkable instances of the good effects of this Tincture, as a *cordial* and antiseptic, antispasmodic, and diaphoretic. One patient was a young gentleman. After having treated the fever in the usual manner, with gentle emetics, diaphoretics, sudorifics (during 15 days no *diaphoresis* or sweating could be produced), antispasmodics, blister, and antiseptics, without success, I sent for Dr. Clerke, of Epsom. The symptoms at this time were the following:—Tongue (formerly white and moist) black and parched; teeth and lips furred with a black viscous kind of matter; delirium, coma, with sudden startings, restlessness, *subsultus tendinum,* picking and searching about the bed-clothes, with tremulous hands; skin, as from the beginning, dry and hot, with, at times, great degrees of flushings in the face; quick and oppressed respiration; pulse 130 in the minute; great debility and faintness, with frequent retching and hiccup; urine and stools discharged involuntarily. It appeared to Dr. Clerke, and I was also of the same opinion, that the patient would not recover. The Doctor prescribed skilfully and judiciously: and as I had only applied a blister to the back, Dr. Clerke ordered one to be applied upon the head. But, notwithstanding all that was done, the patient became

worse,

worse, and could not retain the prescribed medicines. Wherefore I tried the following draught:

R. Tinct. Cardiac. drachmas duas.
Aq. Commun. unciam unam.
Vin. Antimon. guttas xx.
Sal. Nitr. pur. gr. x.
M. Ft Haust. 2da quaqu. hor. sumend.

This draught he kept down; and from this time he became better; the vomiting ceased, the delirium abated, he slept and was refreshed; pulse 100. Having taken several of the above draughts, with very evident benefit, I gave the Tincture in the decoction of bark, in the proportion of drachmas duas ad unciam dimidiam, every four hours. The patient recovered. In recovering he had no speech, nor action of the muscles of the thighs and legs, for several days. The senses and faculties of the mind seemed to be very much impaired, so that he continued for many days peevish, childish, and in a state of fatuity, with a voracious appetite. He was very much wasted; and in particular, the muscles of the thighs and legs, the flexors whereof where contracted for many days.

Of the use of the Tincture in such Fevers, further information may be had in the Seventh Edition of the above Tract, pages 86, 106, 107.

In the putrid fevers of this country, such as *cynanche maligna*, or putrid sore-throat; and in the scarlet fever, with sore-throat, which is only a milder disease than the malignant quinsy; after vomiting (where that operation is judged proper) and purging; and sweating,

by

by the following draught, (to be repeated every ſecond hour till a breathing ſweat takes place)

℞. Aq. Ammon. Acetat. ℥ſs
Tinct. Opii camphorat. ℥ij
Mixtur. Camphorat. ℥iſs
Syrup. Tolutan. ʒij.
M. Ft Hauſt. 2da quaqu. hor. ſumend.

I give from one to three tea-ſpoonfuls of the Cardiac Tincture in a glaſs of port wine, where the faintneſs and debility are great, every two or three hours, with the beſt effect. In both the *cynanche maligna*, and ſcarlet fever, with ulcerated throat, I apply bliſters around the throat, as ſoon as the diſeaſe is aſcertained, with the greateſt benefit.

In the winter of 1800, four perſons of my own family were ſeized nearly at the ſame time with the ſcarlet fever and ſore-throat; and, by treating them as above ſtated, they all recovered. The eryſipelatous eruptions which appeared upon all of them, about the third and fourth days, were followed as uſual by peeling off of the ſcarf-ſkin, &c.

The public are reſpectfully informed that the Cardiac Tincture is expreſsly prepared and put up in pint bottles, for the prevention, &c. of peſtilential fevers, ſuch as the plague, yellow fever, *cynanche maligna*,

maligna, &c. and ſold, at one guinea each, by Meſſrs. Dicey and Sutton, No. 10, Bow-churchyard, London.

It may be expected, perhaps, that, in a publication of this nature, I ſhould have given the formula, or preſcription, and method of preparing this medicine. In anſwer to which, I have to obſerve that none but profeſſional men could prepare it properly; individuals out of the profeſſion could not prepare it at all; and its ingredients are not to be met with in foreign parts. I am therefore in hopes that no public inconvenience can enſue from withholding the preſcription in this place.

The following letter diſplays the generous ſentiments of a celebrated member of the profeſſion upon this ſubject:

Copy of a Letter from the late eminent Surgeon, JOHN HUNTER, Esq. to Mr. RYMER, (the original of which is in his poſſeſſion):

SIR, Being acquainted with the merits of your medicine, I ſhall be one of the firſt to recommend it. It is immaterial whether any one knows the compoſition of it or not, if he knows its effects, which is all that is neceſſary to be known. Whenever I have an opportunity of giving it a preference to other medicines, or when I think a trial of it ſhould be made, I ſhall not have the leaſt objection becauſe it paſſes as a quack medicine; more

especially

especially as I know its composition. Your book is so many proofs of its efficacy. I wish you all success in your pursuits.

I am, Sir, your most obedient servant,

JOHN HUNTER.

Leicester Square, March 22d, 1792.

Moreover, this being a patent medicine, and subject to an agreement, it is conceived that it would neither be regular nor consistent to give its formula in this place. But gentlemen who choose to take the trouble, may see the specification in the Patent Office: when it will be observed, that the two medicines recommended by Dr. Cullen, for preventing the operation of infection, viz. Peruvian bark, and camphire, enter into its composition. Upon this occasion it is proper to state that this medicine has been essentially improved since the date of the patent.

In the patent, the following words occur:

"*Sixthly*, As a powerful antiseptic, in cases of putrid bile, and for counteracting infection, or preventing and curing putrid, malignant, and pestilential fevers, sore throat, viz. *Cynanche maligna*, &c. prevailing in prisons, crowded filthy places, hospitals, ships, hot and unhealthy climates," &c.

Further, as to prevention. The reader will have observed the effects of the fumes of burning brimstone upon the variolous matter, insects, animalculæ, &c. as well as the effects of the flowers of sulphur,

applied

applied externally, for ſimilar ends. What I have now to propoſe, in addition, for preventing the operation of infection, is the internal uſe of the flowers of brimſtone. But here it is proper to obſerve, that I am induced to do ſo from analogy only, not having had ſufficient experience to enable me to draw any certain concluſions as to the effects of ſulphur, adminiſtered in this way for ſuch purpoſes: there are, however, good grounds for the trial of it. Dr. Lewis, in his valuable Materia Medica, ſays of ſulphur:

"Pure ſulphur, taken in doſes of ten grains to a drachm or more, gently looſens the belly, and promotes perſpiration. It ſeems to paſs through the habit, and manifeſtly tranſpires through the ſkin, as appears from the ſulphureous ſmell of perſons who have taken it, and ſilver being ſtained in their pockets to a blackiſh hue, as by the vapour of ſulphureous ſolutions.

"In conſequence of theſe properties, and of this ſubtilty of parts, it promiſes to be of great medicinal powers; but its particular virtues, experience has not as yet clearly determined. In the itch indeed it is a certain remedy, whether externally or internally applied.

"The flowers of ſulphur in ſubſtance ſeem to be preferable for internal uſe to any of the preparations:

they are certainly more ſafe, and perhaps not leſs effectual; as they do not heat or irritate the firſt paſſages, and yet are evidently diſſolved in the body, and carried through the habit."

Profeſſional men will have found the effects of the flowers of ſulphur, taken internally, to have been invariably the ſame as above deſcribed by Dr. Lewis. In the courſe of the laſt thirty years, I have repeatedly had occaſion to take the waſhed flowers of ſulphur, for a complaint commonly called the blind piles, in the quantity of a tea-ſpoonful, or a drachm mixed in about a gill of new milk, in the morning faſting, ſeveral days ſucceſſively, without the leaſt inconvenience during its operation, and with benefit as to the complaint. I always deſiſted from its uſe, whenever I found that the ſilver caſe of my watch was diſcoloured, concluding that I was then duly ſulphurized. But I do not recollect that, upon ſuch occaſions, any one perceived that I had the ſulphureous odour about me.

If the flowers of ſulphur taken into the ſtomach, undergoing certain changes in the digeſtive organs, and being thus changed, are abſorbed into the circulating ſyſtem, and producing ſuch effects as the deſtruction of the animalculæ cauſing the itch, it is not improbable, from the whole view of its general effects

in

in a variety of inſtances, but that its internal uſe may enable the body to reſiſt the operation of infection or contagion. At any rate, as the trial of it in this way is perfectly ſafe, it would ſeem adviſable, that it ought not to be omitted by perſons who are unavoidably expoſed to peſtilential infection.

Upon the above grounds, and for the ſame reaſons, it is probable that the flowers of ſulphur, applied to the ſkin of the human body, would be uſeful in preventing the operation of infection. An ointment compoſed of two ounces of the flowers of brimſtone, and four ounces of hogs-lard, melted and mixed together, may be uſed for this purpoſe. The parts moſt proper to be anointed, are the hams, groins, armpits, and bendings of the arms. About the ſize of a ſmall nutmeg of this ointment ſhould be rubbed upon each of thoſe parts at bed-time, three or four ſucceſſive nights, by perſons expoſed to infection, obſerving to wear the ſame linen and clothes for a due time.

Upon the whole, it may be inferred, that infections or contagions may be readily accounted for from the common operations and laws of nature. The all-wiſe providence of God does not ſuffer elementary matter to remain idle and uſeleſs, but raiſes it again for freſh purpoſes and combinations. The two ſorts of infection

ariſe from matters in peculiar ſtates of putrefaction. 1ſt, Vegetable matters, putrefying under certain modes and circumſtances, give out effluvia capable, when applied to the bodies of men, of inducing intermittent fevers. 2d, Animal matters, putrefying under the like modes and circumſtances, ſend forth vapours, which, when received into the human ſyſtem, produce epidemical fevers of the moſt mortal kind. If, for example, a number of perſons, living conſtantly in the ſame place, were to wear the ſame ſhirts, drawers, and ſtockings, unchanged, for three months, and ſleep in the ſame ſheets during the ſaid three months; and if theſe ſhirts, drawers, ſtockings, and ſheets, thus worn three months, and ſaturated or imbued with perſpirable matter and other animal excretions, were thrown together promiſcuouſly into a heap in a confined place, or tied up into a bundle and ſuffered to remain ſome weeks in that condition, it is highly probable that, by ſome peculiar putrefactive fermentation or inteſtine proceſs, the *plague* or ſome other malignant and contagious diſeaſe would be produced by the effluvia generated by ſuch fermentation, commotion of particles, &c.

From every view of this ſubject, then, it appears incontrovertibly that conſtant and perſevering ventilation

lation and cleanlineſs, in all their bearings and objects, and in the moſt extenſive ſenſe of theſe words, will prove the moſt certain preventive of the generation of infection or contagion.

If ſtrict attention to theſe circumſtances be adviſable amongſt mankind, generally, how much more neceſſary muſt it be to prevent filth, ſtagnant air, and accumulation of noxious vapours, in priſons, hoſpitals, ſhips, &c. and in the crowded and confined abodes of the indigent, eſpecially in great and populous cities? It is not only neceſſary that perſons, in ſuch ſituations, ſhould be furniſhed with the means of cleanlineſs, but they ought to be encouraged or compelled to live cleanly in all reſpects. Beds and bedding ſhould be frequently and well aired. In the navy, it is the general practice, in fine weather, that is, dry weather, to pipe up all hammocks every morning, when each man rolls up his mattreſs, blanket and rug, with the hammock, into an oblong bundle, and laſhes the whole very tight and firm with a cord. Theſe bundles of bedding are then arranged cloſe together in rows, about the quarters, &c. of the ſhip, forming barricadoes, which are proof againſt muſket and grape ſhot. In the evening, they pipe down all hammocks, when every one finds out his own, and takes care of

it.

it. Now, as bedding, under ſuch circumſtances, cannot be well aired; and as it would be impoſſible to air them all at the ſame time in any other way, it is recommended that a convenient number be ſpread out and expoſed to the dry open air, daily, upon the booms, in the boats, &c. in ſucceſſion, till the whole ſhall have been thus duly ventilated. The frequency of this meaſure will be attended with the beſt effects.

It ought to be a rule in every family, &c. that body-linen, including ſtockings, nightcaps, neckcloths, ſheets, table-linen, &c. and eſpecially the foul linen of the ſick, not labouring under infectious diſeaſes, ſhould not remain any length of time together in heaps, but be waſhed, got up, and put away clean and dry, as ſoon as poſſible. As to the linen of perſons labouring under, or who have died of infectious maladies, it ſhould be firſt fumigated with the fumes of burning brimſtone, and then ſoked and ſcoured in quick-lime and water, as has been already pointed out.

With reſpect to the neceſſaries of public buildings, ſuch as of workhouſes, &c. if the neceſſary is included in the inhabited building, and not ſupplied with water to waſh away the ſoil, the ſoil ought to be removed as often as it becomes offenſive: and if alternate layers

of

of freſh or newly burnt quick-lime were thrown into ſuch neceſſaries occaſionally, ſo as at laſt to be equal in quantity to the ſoil, not only the ſtench would be greatly overcome thereby, but the lime thus treated would be found to be a rich and excellent manure; and, in a chemical ſenſe, might properly be called ammoniated and phoſphorated lime, containing, in abundance, elements altogether fit for the purpoſes and operations of vegetation. It is conceived that ſuch a maſs would be too rich of itſelf, and, therefore, that it ought to be worked up with ſome poor compoſt, and ſuffered to remain a due time in the open air.

Quick-lime, by expoſure to the air, has the property of attracting and abſorbing fixed air and vapours nearly equal to its weight. If a ton of chalk be fairly and thoroughly burnt into quick-lime (which is not always the caſe, there being generally numerous pieces of chalk found amongſt quick-lime, which had eſcaped the action of the fire) its weight, when converted into quick-lime, will be about 11 cwt. only; ſo that by calcination it loſes about 9 cwt. By due expoſure to the atmoſphere this 11 cwt. will have abſorbed 9 cwt. of fixed air and moiſture: whence, if 11 cwt. of well burnt and freſh

quick-

quick-lime were thrown upon the ſoil in a neceſſary, and ſuffered to remain a due time, it would be equal in weight to one ton, when removed. But in this caſe, the quick-lime will have ſucked up or abſorbed vaſt quantities of ammoniacal and urinous ſalts, and prove very different from lime ſlaked in the open air. I ſhall conclude theſe remarks upon lime, by obſerving, that as quick-lime, freſh drawn from the kiln, rapidly gains conſiderable weight, it ſhould be taken away as ſoon as poſſible for the purpoſes of lie, for ſcouring infected clothes; whitewaſh; for the ſoil of neceſſaries; and in ſhort for the purpoſes of agriculture, mortar, &c.; for it has been ſhewn, that a ton of quick-lime, expoſed ſome days to the atmoſphere, will have acquired ſeveral hundred weight in addition, and may, therefore, neither be ſo uſeful nor profitable. In fact, when quick-lime has been a long time expoſed in the open air, it becomes ſo much pulverized chalk.

THE END.

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