

Observations on the nature and cure of hospital and jayl-fevers. In a letter to Doctor Mead / [Sir John Pringle].

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OBSERVATIONS
ON THE
NATURE and CURE
OF
Hospital and Jayl-Fevers.

In a LETTER to
DOCTOR MEAD,
PHYSICIAN to his MAJESTY, &c.

BY
JOHN PRINGLE, M.D.
Physician to His Royal Highness the DUKE,
Fellow of the Royal College of Physicians at
Edinburgh, and of the Royal Society.



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Doctor *M E A D.*

S I R,

WHILST I was revising the notes I had made on the diseases most incident to an army, the jaund distemper having broke out in such a manner as to alarm the town, I thought I could not comply more seasonably with your desire of having them published, than by communicating at present, that part of my observations which related to this disease.

For, however fatal it has been since the sessions, it is highly probable the calamity will be in a great measure confined to those who were present at the tryal; especially, if the

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weather continues moderately cool. Yet as people may justly be under some apprehensions as long as the distemper lasts, I thought it my duty, to offer these few sheets to the publick; that whatever be the consequence, I might not hereafter have reason to upbraid myself with having suppressed any useful discovery my experience may have furnished in these matters, from the consideration that they were to go abroad, in a loose and unfinished manner. And I the more willingly embrace this occasion of writing, that as at this time every body is inclined to listen to the subject, those whose special business it is to take care of jayls and other publick places, which neglected, produce malignant and contagious distempers, may have more materials whereby to judge of the great danger arising from them. For tho' the present fear of the contagion spreading, may soon subside, yet I am certain, that however rarely our jayls produce such visible noxious effects, they are often one of the more insidious sources of slow and malignant fevers, which generally prevail in large and crowded cities. Thus, in the late case of infection, from the quantity of the contagious matter, the closeness of the air, and crowds of people.

ple to render its corruption more quick, a distemper arose so suddenly, and was so violent, general and fatal, that every body now refers it to its true cause: whereas, if the number of malefactors had been fewer, the multitude less, and the air freer, so few would have been seized, and that with fevers of a slow and less alarming kind, that the cause might have been intirely overlooked.

These and other general points will be illustrated by some observations in these papers; and I hope that those who have power to rectify abuses, will receive them favourably, from one, whose publick employment has given him many opportunities of seeing the fatal consequences of such a sort of contagion.

As for what relates directly to the practice, since that is chiefly intended for those of our profession, who have been less acquainted with the distemper, I hope they will receive in good part, what I offer them as the result of my experience in these matters: nor can I doubt of their acceptance, if agreeable to you; whose judgment will always have the greatest weight with them, both on account of your

dignity in the profession, and the authority of your own excellent writings on contagious diseases. And I am satisfied both from the zeal you have shewn on all occasions for the publick service, and also from the favours I have already received from you, that if there is any thing useful in these observations, they cannot fail of having your protection.

THE hospitals of an army, when crowded with sick, or when the distempers are of a putrid kind; or at any time when the air is confined, especially in hot weather, produce a fever of a malignant nature, always accounted fatal. I have observed the same sort of fever to take its rise in crowded barracks, and in transport-ships, when filled beyond a due number, and detained long by contrary winds; or when the men were kept at sea, under close hatches, in stormy weather.

The cause seems plainly to arise from a corruption of the air, pent up and deprived of its elastic parts by the respiration of a multitude; or more particularly vitiated with the perspirable matter, which, as it is the
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most volatile part of the humours, is also the most putrescent.

As soon as I became acquainted with this fever in the hospitals abroad, I suspected it to be the same with what is called here the jayl-distemper, which I had never seen; and was confirmed in my opinion by having an opportunity of comparing them, which was furnished by the following accident.

In the year 1746, whilst the troops under the command of his Royal Highness the Duke encamped at Inverness, about the middle of May, Brigadier Houghton's regiment, which with three more had been sent as a reinforcement, landed at Nairn, and joined the army. A few days after, twelve men of that corps were sent into the hospital with fevers, and were blooded largely upon admission; but next day not observing the coughs, stitches, and rheumatic pains, the common symptoms of the fever at that time prevailing in the camp; and moreover finding, that the bleedings had sunk the pulse, and that some had an uncommon *stupor*, I immediately referred this fever to the malignant kind; concluding it had taken its rise from

the confinement and bad air of the ships during the voyage : yet I thought it strange, that this battalion, and none of the rest, should be so sickly.

But, upon farther inquiry, I was informed, that this fever came directly by contagion from the true jayl-distemper, communicated in the following manner. A few months before, we had taken a French ship, on board of which were some troops sent to assist the rebels ; and in that number some English soldiers, who having formerly deserted to the French in Flanders, as Malefactors, were thrown into jayls, where they were kept till an opportunity offered of sending them by these transports to be tried by a court-martial at Inverness. These prisoners, being thirty-six in number, brought with them the jayl-distemper, and gave it to the regiment with which they were embarked,

In three days after coming ashore six of the officers were seized with it ; and the regiment, in the few days it lay at Nairn, left about eighty sick ; and in the ten following, that it remained at Inverness, sent into the hospital about one hundred and twenty ill of
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the same fever ; who being under my care, I had the best opportunity of examining the distemper, which I found differed in nothing from the usual hospital fever, in either symptoms, violence, or cure.

I shall therefore consider the two diseases as one, and shall communicate the observations I have made upon them ; as I have met with no author who has treated them in so clear and full a manner as to enable a physician either to know or cure them. For the symptoms of this distemper varying so much, according to the degree of the contagion, and state of the patient when he falls ill, it may be easily mistaken for a fever of a different kind ; and the error will be the greater, as the cure is so unlike that which succeeds in other fevers, beginning with the same symptoms.

I shall, 1. Describe the manner of the infection. 2. The symptoms. 3. The prognostics. 4. The dissections of those who have died of it. 5. The cure. And, lastly, The precautions necessary to prevent it.

SECTION I.

Of the manner of the infection.

THIS fever is proper to every place that is the receptacle of crowded men, ill aired or kept dirty; or what is the same, wherever there is a collection of putrid animal steams, from dead or even diseased bodies. When a person is confined in such places he will run a hazard of falling into this distemper proportional to the time he stays there; whether he draws in the poison with his breath, or swallows it with the *saliva*. And upon this account, jayls and military hospitals, are most obnoxious to this kind of pestilential infection; as the first are kept in a constant state of filth and impurity; and the last are so much filled with the poisonous *effluvia* of sores, mortifications, dysenteric and other putrid excrements. And as to ships, besides the number of men, and confined air, as an additional ferment, the corruption of the bilge water, is not only a main cause of the sea scurvy, but often concurs in crowded ships, to raise a fever of the hospital or jayl kind. Moreover, by opening

opening the bodies of those who have died of very putrid distempers, and holding the head too long over them, a fever has been caught of the same nature. And I have known two instances of its beginning in the close wards of an hospital, where there was no other cause but one of the men having a mortified limb. Nay, it is even certain, that a single person lying in a small apartment, or with the curtains of the bed too close, being ill of a putrid distemper, such as the small-pox, dysenterie or bilious fever; as also after the amputation of a limb, or in any large ulcer, especially in hot weather, will fall into a slow fever of the jail kind. I have observed the same thing in camp, whenever a soldier or officer is taken ill of any feverish disorder, and keeps his tent too close; for by penning up his own *effluvia*, he will, sooner or later, fall into a degree of this fever. But, excepting a few such occurrences, this is not properly one of the distempers of a camp, tho' it be universally accounted such; for being frequently seen in camp hospitals, it is therefore supposed to come from the field. In general, whenever in the less airy and cleanly parts of large and populous cities, a slow and low fever prevails, with

some symptoms that shall be hereafter described, we may conclude it belongs to this class of diseases; whereof the first and most exquisite, is the true plague, which YOU have shewn to arise from a high degree of putrefaction of animal substances in a sultry climate*.

The degree of contagion and malignity of these fevers depends on two circumstances; First, the long continuance of putrefaction in the same place: and, Secondly, the degree and quantity of it. We have an instance of the first kind in jayls and dungeons, which are perhaps left foul for ages, and where by reason of the long succession of animal filth and nastiness, the putrid ferment is exalted to so high a degree, that the very breath or cloaths of malefactors will spread the infection. The second is most apparent in hospitals, which tho' of no long standing, yet by the great quantity of putrid exhalation, will produce the same effect. Of this we had many instances during the war, but I shall only mention one of the most memorable which happened in the campaign in Germany. When the dysenterie being epidemic in the camp, and the hospitals crowded

* Vid. Dr. Mead's discourse on the plague.

with men ill of that distemper, a very malignant fever was thence produced. Few escaped ; for how mild or bad soever the flux was, for which the person was sent to the hospital, this fever almost surely supervened. The petechial spots, blotches, parotids, frequent mortifications, and its great mortality, characterized a pestilential malignity ; in this it was worse than the true plague, that there was no security against a relapse ; but on the contrary, almost a certainty of it, if the person continued in the infectious air : Of fourteen mates employed about the hospital, five died ; and excepting one or two, all the rest had been ill and in danger. The hospital lost near half of the patients, but the inhabitants of the village of Feckenheim, where the sick were, having first received the bloody flux, and afterwards the fever by contagion, between the two were almost utterly destroyed. The similarity between this fever and a true pestilence, was farther evinced by this remarkable incident. A parcel of tents were put on board the same bilanders which transported the sick from Germany to the low countries down the Rhine, and which being to be refitted at Ghent, were put into the hands of a tradesman who employed twenty

three journeymen about the work ; but those unhappy men were quickly seized with this fever, whereof seventeen died.

But, setting aside these extraordinary instances of high malignity, the common course of the infection is slow, and only catching to those who are constantly confined to the bad air ; such as the sick in hospitals and their nurses, and prisoners in jails. And where there is not a great quantity of infectious matter, or of that highly exalted ; or when a person has not breathed long those dangerous steams, the symptoms come on so slowly, that there is time for prevention before the fever is quite formed. Much will also depend on the constitution of the person ; sometimes one will have this fever hanging about him for several days, before it confines him to his bed ; others I have known complain for weeks of the same symptoms, without any regular fever at all ; and some after leaving the infectious place without complaint, have afterwards fallen ill of it.

SECTION II.

Of the symptoms.

I Come now to the symptoms, which are as follows: When the distemper comes on slowly, the first complaints are gentle horrors and little feverish heats, alternately succeeding each other, with loss of appetite; and their disorder being greatest at night, the body is hot, the sleep interrupted and not refreshing. They have constantly some pain and confusion in their head, chiefly about the forehead; the pulse is at first little quicker than natural; and the drought, if any, is inconsiderable. Upon the whole, they find themselves too much indisposed to go about business, but too well to be altogether confined. In this state sometimes a change of air will remove all the symptoms; sometimes a vomit and a sudorific. I have had experience of both methods of preservation in my own case. What may seem very particular; I have more than once known a large bleeding while the person was going about with such symptoms, so far from relieving the head, imme-

immediately sink the pulse and bring on a *delirium*.

When the symptoms come on quick and violent, the fever is not easily distinguished in the beginning from one proceeding from inflammation, or other causes. The greatest certainty of the diagnostic is then founded on the knowledge of the circumstances; whether, to wit, the patient has been exposed to the usual causes of fevers, or to foul air and infection; again, whether he is relieved by bleeding or not; because, in inflammatory fevers, bleeding constantly moderates all the symptoms, but in this it rarely gives ease; nay often it exasperates all the complaints. The symptoms already mentioned are all in a higher degree; and to these are added, great lassitude, *nausea*, and pains in the back, pain and confusion in the head, attended with a great dejection of spirits. At this time the pulse is never sunk, but generally beats quick and full, tho' rarely to that degree observed in fevers of much less consequence. The first bleeding, if moderate, affects the pulse little; but if the evacuation is large, and especially if repeated to answer a false indication of inflammation, the pulse increasing in frequency will be apt to sink in force, often irre-

irrecoverably, while the patient becomes delirious.

The blood has been found so various, that it is not easy to predict what will be its appearance; for tho' commonly it is little altered, it has been seen very fizy, not only in the beginning but in the progress of the distemper. The worst kind is when the cohesive part or *crassamentum* is dissolved, which is a mark of the highest state of putrefaction; but the most common sort is of a natural colour and consistence, with the *crassamentum* either sinking in the *serum*, or else with a slight shew of inflammation. It is probable, that unless a person has fizy blood, from other accidents of the season, or his constitution, that on this occasion it will appear with little or no inflammatory crust. Our observations have pursued this point no farther; and the less, that we soon saw, with what caution and how sparingly a vein was to be opened in this distemper.

The urine sometimes, but rarely, carries great marks of fever; it is sometimes at first of a reddish or flame colour, which it preserves throughout; at other times it is pale,

and varies from day to day in colour as well as crudity, being sometimes clear, sometimes clouded: but towards the end, when the distemper takes a favourable turn, it becomes thick, and at last deposits a sediment. But a sediment in the urine, without other changes to the better, is no sure mark of a recovery: neither, on the other hand, ought the want of it to be any discouragement, since many have recovered without any sediment at all, when their water becomes only more turbid about the crisis.

If the sick lie warm, and have had no preceding flux, the body keeps generally costive; but when they lie cold, as they often do, in field hospitals, the pores of the skin being altogether shut up, a *diarrhœa* is a common symptom; but in that case is never critical. But when men have not been exposed to cold, and yet have bilious stools, they are to be considered as critical; and therefore not to be checked, unless immoderate. In the worst kind of these fevers a *diarrhœa* is often the last stage, but then it is of a different sort; the *fæces* are involuntary, colliquative, ichorous, or blackish, and of a cadaverous smell, which
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are the effects of a mortification of the bowels, and the sign of approaching death.

The heat of the body on first touching it, does not seem very considerable; but upon the feeling the pulse for a while, I have sometimes been sensible of an uncommon heat, attended with a very particular sensation, which left an impression on my fingers for some minutes afterwards. The first time I perceived it I referred this feeling to the force of imagination; but I was afterwards assured of the reality of the thing by repeated experiments, and by the testimony of others, who, without knowing of my observation, made the same remark *. A day or two before death, the extremities feel quite cold, and then the pulse is hardly to be felt.

I have since met with a passage in *Galen*, to much the same effect: *Februm, quæ a putredine oriuntur maximum indicium est, mordacitas & acrimonia caloris, quæ perinde ac fumus nares & oculos, sic ipsa erodere tactum videtur.---Non statim ea qualitas, admota manu discernitur; at per moram predicta caliditatis species effertur ex penitioribus partibus.* Lacun. Epit. Galeni de differ. Febr. Lib. 1. C. vii.

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The skin is generally dry and parched ; but often there are short and imperfect sweats, especially in the beginning, which never give relief. A continued and general sweat is the surest cure, tho' the same may be also brought about by a more insensible perspiration. The sweats are always fetid ; and at all times of the fever, the patient, if delicate, complains of an ill taste of his mouth, and an offensive smell, till a *stupor* or *delirium* makes him insensible.

The tongue is generally dry, and without constant care of the nurse becomes hard and black, with deep chops ; but this symptom is common to many fevers : what may be particular to this is, that sometimes the tongue will be soft and moist to the last, but the colour changes into a mixture of green and yellow. The drought is sometimes great, at other times very little, whether it be that nature makes no demand for liquor, or that the *stupor* deprives the patient of the sense of it.

Some preserve their senses, allowing for a confusion and *stupor* through the whole course of the disease till recovery ; few keep them

them till death. They rarely sleep, and at all times look like men pensive or in deep thought rather than a fever. The face is late in acquiring either a ghastly or a very morbid look. The confusion of the head often rises to a *delirium*, especially at night, but rarely turns to rage, or to those high flights of imagination frequent in other fevers. It is likewise more common to observe a *tremor* than a *subfultus tendinum*; or if that symptom seizes them, it is in a less degree than in inflammatory fevers. All along as the pulse sinks, the *stupor* or *delirium*, and *tremor* increase; and in proportion to its rising the head and spirits are relieved. Frequently from the first beginning the patient is dull of hearing, and at last grows almost deaf.

There is always a great dejection of mind, and failure of strength. When the *delirium* is at its height, the face is commonly flushed, with the eyes red, unless after large evacuations, when it appears meagre, the eye-lids in slumbers only half shut, and the voice, which is constantly slow and low, sinks to a degree scarce to be heard.

When the fever is protracted with a low pulse, they have a particular craving for something cordial; and nothing is so acceptable as wine. They long for no food, but take willingly a little panado, if wine is added.

Vomiting, and complaints of a load and sickness at the stomach, tho' frequent, are but casual, and seem not essential to the disease. Neither are pleuritic stitches, difficulty of breathing, or flying pains any part of it, farther than that the patient's constitution may dispose any fever to fall upon a weak part, or that a previous cold may have affected some particular organ.

There are certain spots which are the frequent but not inseparable attendants of the fever, in its worst state. These are less usual on the first breaking out in hospitals; but when the air becomes more corrupted, the spots are common. They are of the petechial kind, of an obscure red colour, paler than the measles, not raised above the skin, of no regular shape, but confluent. At some distance the skin looks only a little redder than ordinary, as if the colour was uniform;

form ; but, upon a nearer inspection, the interstices are seen. For the most part they are little conspicuous, and unless lookt for attentively, may escape notice. These *petechiæ* are very irregular, sometimes appearing as early as the fourth or fifth day, and at other times as late as the fourteenth. They are not at all critical, nor are they reckoned among the mortal signs, as they only concur with other circumstances to argue more danger. The nearer these spots approach to a purple colour, the more ominous they are, tho' not absolutely mortal. In a few cases, instead of spots I have observed purple streaks and blotches, but which is not confined to this fever, but extends to others of the autumnal and bilious kind, with a putrid state of air. Both these spots and blotches will sometimes not appear till after death ; and we had a case in the hospital, when, after bleeding, the *petechiæ* appeared on the arm, below the ligature, and no where else on the body.

This fever, tho' of the continued kind, has generally such exacerbations at night, as to quickness of pulse, restlessness, and *delirium*, that it may perhaps be considered as the lowest degree of the remitting kind.

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The duration is uncertain, the time depending upon the malignity ; for in proportion to its virulence, the course is quicker. In the hospitals we have had it generally running from fourteen to twenty days, some have died or recovered after four weeks illness. When the course is long, it commonly terminates in abscesses of the parotids or axillary glands ; sometimes in a hectic ; and whenever the fever is of an extraordinary length, it is probable the latter part is kept up by the formation of some abscess. Others upon coming out of the fever, are seized with an irregular intermittent ; many complain of a pain in their limbs and want of rest ; and almost all of great weakness, confusion in their head, and noise in their ears. When the air is at the highest pitch of malignity, the course of the distemper comes to be very rapid, so as to terminate in five or six days, either in death or a critical sweat.

Of all these symptoms the most peculiar to the distemper are always a singular attack upon the head, either in the form of a *stupor* or pain ; and if the disease lingers, a slow and low voice, sinking of the spirits and pulse without any large evacuation, pale urine,

urine, petechial spots, the bad effects of large bleeding, and little advantage of blisters; lastly, the disagreement with cooling medicines, excepting in the beginning; and on the other hand, the agreement with wine volatiles and other cordials during the greatest part of the disease.

Having now described the most distinguishing marks of this fever, it will be proper to add, that there are certain low degrees of the same malady which are hardly to be characterized at all; and which can only be discovered in full hospitals by observing men languish; tho' the nature of the distemper, for which they came in, should seem to admit of a speedier cure. In these cases the only marks are little headachs, a whitish tongue, want of appetite, and other inconsiderable feverish symptoms.

SECTION III.

Prognostics.

MEN who have been weakened by other distempers, or by cures, as those who have undergone a salivation, are much more suscep-

susceptible of the infection, than the strong and vigorous, and run the greater risk. Those who are taken into crowded hospitals with the small-pox, however good the kind may be, and however well they may get through the two first stages of the distemper, fall readily into this fever and die. One who is recovered is more subject to a relapse, than he was to the fever at first. But it has not been observed if those who have had abscesses are as liable to relapses as others. The second fever is attended with double danger, as the patient has been so much weakened by the first. Women, if infected, generally escape better than men; which seems owing to the laxity of their skin, more favourable to a sweat. A sure sign of the corruption of the air of the hospital is, when many of the nurses fall sick.

All the prognostics taken singly are uncertain; only it may be observed, as in many other fevers, that the following are good signs: To have no *delirium*, to have the pulse neither very low nor quick, or if sunk, to have it rise by wine or cordials, with an abatement of the *delirium*; and to have the tongue moist and of a natural colour. But
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it seems peculiar to this fever, that deafness is rather a good sign. The natural and best *crisis* is by sweat, when the pulse rises, and all the symptoms abate; next to that, an insensible perspiration, known by the softness of the skin, moisture of the tongue, and a remission of the other symptoms. Bilious stools with turbid urine, and a moist tongue, may be considered as signs of a favourable *crisis*. But the contrary of all these signs are bad, as also the *subfultus tendinum*, inflamed eyes, and great anxiety. It is observed to be amongst the worst signs, when the patient complains of blindness, or when he cannot lie but on his back, and pulls up his knees; or when insensible, he endeavours to uncover his breast, or makes frequent attempts to get out of bed. If there are ichorous, cadaverous, and involuntary stools, it is a sign of certain death.

S E C T I O N IV.

Dissections.

Hitherto we have examined the state of the living body, we shall next consider its appearance after death, and see how

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far by dissections, we may advance in the knowledge of its nature and cure. And how little soever successful we may have been in this research, it will still be satisfactory to think, that this kind of enquiry has not been wholly neglected.

The dissections of those who have died of the common hospital fever, or of Brigadier Houghton's regiment, which had the distemper by infection from the jails, have been in all ten; at all which I have either assisted, or had the relation from those I could rely on. In some of the bodies, all the cavities were opened; in others, either the brain alone was seen, or bowels. These limitations and imperfections of this part of our enquiry, I thought proper to mention, that if any thing farther was to be learned from dissection, what we have done might not be considered as compleat, or preclude others from pursuing this point farther.

+ The most unexpected appearances after death, were abscesses of the brain, which I shall therefore more particularly mention. The first I saw of this kind was at Ghent, but the man being brought into the hospital from
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the barracks, only two days before he died, from the symptoms and account I had of his disease, I only could conjecture that his death was owing to this fever, after lingering near a month in it. We found about three ounces of purulent matter in the ventricles of the brain. What seemed still more extraordinary, a little of the same kind of matter was found in the substance of the *cerebellum*; and the whole cortical and medullary substance of the brain, was extremely flaccid and tender. Yet what was very remarkable, this person with some *stupor* and deafness, had his senses till within a few hours of death so entire, that he gave distinct answers to any question asked him. But in two other instances of men who undoubtedly died of this fever, in one the brain was *suppurated*; in the other, the *cerebellum*.

In the first of these the patient was under a *stupor*, with deafness from the beginning, but was never delirious, or altogether insensible. His pulse sunk very early. About ten days before he died, his head began to swell, and continued very large all over, till within two days of his death, when it sub-

fided a little. For several days before he died, he would taste nothing but cold water. During his illness, he lay always on his right side. In the head was found an abscess as big as a hen's egg, in the substance of the forepart of the right hemisphere of the brain, and full of a thin matter like whey. At that time, five more ill of the same fever had the like swelling of their heads, but recovered. This extraordinary symptom I never observed before nor since.

In the other case, the abscess in the *cerebellum* was about the size of a small pidgeon's egg, containing also a thin ichorous matter. Nor had this patient been ever so thoroughly insensible, as not to answer reasonably when spoken to. Two days before death, his urine turned very pale. Both these bodies were opened by Mr. Breach, apothecary in Southwark, then mate in the hospital.

But nevertheless, suppurations in the brain were not constant; for another who died about that time, and had been ill about the same number of days with the like symptoms, the pale water excepted, had no abscess in
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neither the brain nor *cerebellum*. And a third died some time after, whose brain had an inflammatory appearance, but no suppuration. In this subject the underfide of the liver was beginning to mortify; the large guts were so already, and the smaller much inflamed. This man went off with a looseness, and just before his death had a discharge of an ichorous matter from his nose. In the military hospital at Ipswich, one dying of this fever unexpectedly, after having been once in a fair way, had no suppuration in his head. About the same time, Dr. Clephane acquainted me he had seen the head of one opened who died after an abscess formed in both the orbits; the brain was very flaccid, and in the ventricles was found about two ounces of a thin *serum*: but neither of these two bodies were further inspected.

I shall not enter into a description of other particulars in these dissections; for tho' I have them written at length, it may be sufficient here, from all that has been made, to draw the following general observations.

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That as there is the greatest tendency to putrefaction through the whole course of the disease, so it always either terminates in an actual mortification of some part, or in an abscess of the brain, often ichorous. The intestines more particularly are subject to mortify; and by an observation we have made of the *petechiæ* appearing for the first time after death, it seems reasonable to conclude, that their common appearance in the course of this distemper is a tendency of the same kind. The putrid sweats and smell of the body are a farther argument for what has been advanced.

That as to the abscesses so often found in the brain, the ichorous kind may be considered as a species of mortification proper to parts of that texture. And from the preceding cases it seems probable, that these impostumations are not very rare occurrences in this fever.

From the inflammatory appearance of the brain, without suppuration, we may account for the same medicines having sometimes, in this fever, quite opposite effects. For tho', in general, warm and spirituous medicines are
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the best, yet there are some who cannot take them without increasing the *delirium*. Such therefore, over and above the malignant disorder, may have an inflammation of the brain, as in a common fever.

The last observation I shall make upon the occasion of dissection, is, that the tendency of this fever to putrefaction, reduces it to the same class with the malignant kind of the small pox, some hectic fevers from absorbed matter, the ardent and bilious fevers of moist and hot countries; and, in a word, with all feverish disorders, remarkable for a prostration of strength, sunk pulse, dejection of spirits, drought, remissions, putrid sweats and stools, livid blotches, and the like symptoms. In all we shall find either an external putrid cause, or an internal *fomes* of corrupted matter; and in all an analogy as to the cure.

These are all the inferences we may safely draw from the inspection of the bodies. But from such materials to account for all the varieties of this fever, would be too great an attempt. Nor would it be just to propose our method of cure, as deduced from the inspection of dead bodies, since
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the most successful part of it has been taken from experience only. This must be acknowledged, that, comparing the natural qualities of the medicines with the notion we must entertain of the disease, we shall still be more convinced of its putrid nature, since all the remedies prove to be of the anti-septic kind.

SECTION V.

Of the Cure.

IN the cure of this fever, as in all others, we must vary our method according to its state. I shall distinguish it into three periods, and in each propose those remedies I have found by experience to be the best. Let us suppose the first to continue as long as the person is able to go about; the second to begin with his confinement, when the fever is apparent, the pulse full and quick, and the head much affected; and the third, when the pulse sinks, and a *stupor* comes on, with other symptoms already described.

In the first period, as well as in all the rest, the fundamental part of the cure is, to remove

move the patient out of the foul air ; but when that cannot be done, the room or ward is to be purified by making a succession of air by means of fires, or letting it in by doors and windows, burning incense, or the like ; for whatever medicines are given, whilst the air continues in this corrupted state, or indeed increases in it by the *effluvia* of the diseased person, there can be little or no hopes of a cure. Wherefore, in every stage of the disease, tho' the patient can breathe no other infectious air, but of his own atmosphere, it will be necessary to keep the curtains undrawn, and use all other means to procure a free ventilation. In the strict observation of this rule the cure will, in a great measure, depend.

For the next article of prevention, I have usually given an Ipecacoan vomit, and, after the operation, a moderate bolus of *Theriaca*, with ten grains of Sal C. C. and some draughts of vinegar whey ; and repeated the same without the vomit the next night. By this means I have generally seen those complaints removed, which I apprehended were the forerunners of the fever. But previous to the vomit, if the person is plethoric, or be-

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gins to have a greater degree of fever, it will be necessary to take away some blood. I must not omit, what may appear a minute circumstance, that as, not only now, but afterwards, the cure depends so much upon a free *diaphoresis*, it will be found conducive to that end, especially with the less cleanly sort, to have their feet and hands washed with warm vinegar and water. After these sudorifics, if the patient is to remain in the foul air, it will be necessary to use as a preservative the *alexipharmac* I shall treat of afterwards.

But, in the second stage, when the fever is manifest, and with a full pulse, it will be always proper to begin with a small or moderate bleeding. When the symptoms are high, a plentiful evacuation seems requisite; yet large bleedings have generally been fatal, by sinking the pulse, and bringing on a *stupor* or *delirium*. Nor is a moderate bleeding to be repeated but with the utmost caution; for as many things here are contradictory to the common maxims, so experience shews, that even those whose blood is considerably fizy, unless the lungs are inflamed, are generally the worse for a second bleeding.

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If only the head suffers, I have found it safer and more effectual to bleed by leeches at the temples, than to open a vein in the arm. But in the *delirium*, with a sunk pulse, even leeches do no good, and phlebotomy is pernicious. Many have recovered without bleeding, but very few who have lost much blood.

Vomits are also to be used cautiously. Before the disease is formed, one is recommended for prevention; and even if the stomach has been previously foul, as is most usual in autumn, an emetic is also proper in the beginning of the second period, as it not only relieves the stomach, but disposes more to a sweat. But when the fever is fixed, and a vomiting supervenes, which is always a bad symptom, an emetic will then be dangerous: at most some draughts of chamemile tea, or the like, may be given, and afterwards the medicines that are usual in such cases, to quiet the spasms; and to these a clyster should be added, to determine the humours downwards.

The next care is to promote a *diaphoresis*; but in this state of the distemper it is only to

be attempted by the milder sudorifics. The *Contrayerva* powders, with nitre, are safe, but scarce efficacious; much dilution only oppresses the stomach, and the volatiles by themselves heat too much: neither will acids do alone; but the two combined are powerful. And therefore when a sweat is to be moved, it will be more easily and safely done by the *Spiritus Mindereri* than by any other medicine I have tried.

If the patient can have a thorough sweat, with a rising pulse, it may prove critical; but unless a sweat comes easily, it is never to be forced: and if voluntary and profuse in the beginning, with a low pulse, it must be checked. All the time the distemper is in the second stage, acids are no less grateful than necessary. And both here and in the following low state of the fever, costiveness is to be prevented by emollient clysters, lest an accumulation of *fæces* in this putrid disease prove a new *focus* of corruption.

At this time I have also used blisters, but without success. Upon the first attack the whole head has been blistered; but neither the *stupor* nor *delirium* were prevented.

Opiates

Opiates are dangerous in this state, and unsafe in the following; for if they fail in bringing out a sweat, they are sure to fix the *delirium*. In one case they are necessary, namely when the pulse sinks, with a *diarrhœa*, when to the medicines belonging to the third stage, some drops of the *Tinctura Thebaica* may be added.

We come now to the third and longest period, in which the pulse sinks, the *stupor* increases, and *petechiæ* often appear. This change happens in three or four days after the fever is formed; sooner or later, according to the treatment, or other circumstances. What is very observable, if the patient on the first complaints has been once or twice largely bled, the disease will be apt to pass over the second state; so that from a condition little removed from health, he may have his pulse sink at once, and become delirious. Now, whether by misconduct or the course of the disease this alteration comes, we must alter our method, and have for our principal intention to support the *vis vitæ*, which now cannot be done but by warmer medicines.

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Our most general remedies have been few, viz. an alexipharmac decoction, a cordial mixture and wine given alternately. In the administration of which the attendants of the sick are to be strictly charged never to allow the patient to be above two hours at farthest without taking some of them. In the low state of this fever, if there is a free air, all depends upon a punctual observation of this rule. I have seen men in a promising way, sunk past recovery, by being allowed to pass the night without something cordial or nourishing.

At first our alexipharmac consisted only of the *Rad. serpentariæ*, with a small quantity of a spirituous water. Or in the place of that form, I have given the same medicine in substance, from four scruples to two drachms a day, with sensible good effects. But in the last campaign, an accident gave the hint of an useful addition. A man ill of this fever, with petechial spots, having his back blistered, the part mortified: The case seemed desperate, but a decoction of the *bark* being given, and continued for some days, with the usual remedies, the sore began to suppurate, and the fever to take so favourable

able a turn, that there was little doubt of the patient's recovery ; till nauseating the medicine, he left it off ; whereupon the gangrene recurred, and he died. From hence, however, I was induced to join the *bark* to the former decoction, and gave it constantly afterwards in the sunk state of this fever. The first nine recovered who had this compound medicine, tho' four of them had the *petechiæ*, but the rest a less malignant degree of the distemper. And in thirty nine cases that were under my care that season, I lost only four. But it will be just to add, that the places in which the sick lay, were uncommonly well aired ; and that the distemper went not to that high degree of malignity I have at other times seen it. For at Ipswich, where the kind of fever was worse, and where the air was so much vitiated in the hospital, that almost all the nurses were infected, as well as the men who were brought in for other distempers, I reckon, (for I kept no exact account) that I might lose about double that proportion. Upon the whole, from the experience I have had of this method, and especially if due regard is had to the freedom and purity of the air, and the care of the attendants, I can be assured that in the common

mon run of this fever, there will be no more danger than in most others.

When I first joined the *bark* to the *serpentaria*, I intended to begin with little, and to rise by degrees, but finding what was given at first answered so well, I never altered the quantity ; which was of each ingredient three drachms in a pint of water boiled down to the half, with an addition of an ounce and an half of strong water ; and this to be consumed in thirty six hours or two days at most.

By means of this decoction, and the other remedies, not only the strength is supported, but a *diaphoresis* is promoted. Even after the recess of the fever, the same medicine being continued in a smaller quantity, not only served by way of strengthner, but also as a preservative against a relapse, as long as the patient remained in the hospital. In one case the fever terminated in a suppuration of the left parotid, which was opened and healed during the use of the same medicine.

The cordial consisted of a moderate quantity of a spirituous water, but with a larger
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dose than ordinary of the Sal C. C. of which the hospital patients generally had, from one scruple to half a drachm a day. But in cases out of the hospital, and where there was no restriction as to the quantity of wine, I either omitted the volatile, or used it sparingly. In general, it agrees well with the low state of these fevers; and in great sinkings, which either come after unseasonable bleedings, or long want of nourishment, was the best resource. I have sometimes added the *spiritus mindereri* to procure a sweat.

But for an universal cordial in the low state of this fever, there is nothing comparable to wine, whereof the common men had an allowance to half a pint a day, of a strong kind. But to others out of the hospital, I have commonly given French wine, of which they have often consumed a quart a day, and perhaps half of that undiluted. In the hospital the wine was sometimes given in whey, but commonly in panado, which was their only food. And indeed, so great is the virtue of wine in the cure of this kind of fever, that I have known several recover from its lowest state, when they refused the decoction on account of its taste,

taking nothing but their panado, wine, and the volatile cordial, every two hours, by turns.

We have seen how inseparable a *stupor* was from this fever, particularly in its low state; and how apt this in the evening was to turn to a slight *delirium*. If this is all, as it is in the common course of the distemper, nothing need be done; but if the *delirium* is great, with a *subfultus tendinum*, and redness of the eyes, there is a presumption of a true *phrenitis*. And agreeably to this, I have observed, that at such times, wine and other hot medicines aggravated the symptoms: And here it is that the blisters most apparently do service. But in the ordinary *stupor*, and sunk pulse of this fever, I have found them less efficacious than *sinapisms* applied to the soles.

We shall next consider the state of the patient after the distemper is over, or changed into some other shape. If the fever terminates in the suppuration of the parotid glands, there is only one caution needful; which is, that the abscess is to be opened as soon as it can be conjectured to contain matter, without

out waiting for a pointing, fluctuation, or even a softness of the *tumor*, which sometimes may never happen; the pus being often here so very viscid, that before incision, the gland will feel as hard as if the suppuration had not begun.

Almost all, when the fever is over, complain of want of rest, frequently of a *vertigo*, with a continuation of the deafness, and other nervous symptoms, the consequence of great lowness. The remedies are the *pil. Matthæi* at night, with analeptics, and medicines of the strengthening kind. When the pulse is slow, about ten grains of *asa fætida* twice a day, has a good effect; but if there is any appearance of a hectic fever, from an inward abscess, the case is to be treated accordingly.

Sometimes the person falls into an irregular intermittent, which (if not hectic, from the same cause) may proceed from an omission of evacuations of the *primæ viæ*. For it is easily conceived, that after a long fever of a putrid nature, attended with a languor of the bowels, the *fæces* must be accumulated, so as to occasion various disorders: but

in these cases, after proper evacuation, the *bark* is a sure remedy.

Thus I have delivered the general practice which I found most successful in these malignant fevers. The medicines are few and simple; and whoever considers the circumstances of a large hospital, will understand the necessity of reducing them to the narrowest compass, as well as to things of the easiest purchase. Not that I have omitted making tryals of other medicines occasionally, as they were recommended by others, or what occurred to myself; but I have never observed any of their effects sufficient to induce me to prefer them to those mentioned above.

I have been sparing in the use of acids in the low state of the fever; for tho' their antiseptic qualities were indicated, I was apprehensive they might relax too much. Perhaps those of the mineral kind may be less liable to exception, particularly the spirit of vitriol; but that I never tryed, being convinced that wine was the best antiseptic, and at the same time, cordial.

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It may be objected to the volatile salts, that being a strong *alkali*, they must therefore dispose the humours to putrefaction. But we are to consider, that *alkalis* and putrid substances, are very different; insomuch that I find from experiments, out of the body, that salt of hartshorn is even antiseptic, since it preserves animal substance from putrefaction.

And as for the *bark*, I shall take this opportunity of communicating the result of some experiments I have made on it, to the same purpose. For, having had frequent occasions of seeing its virtues, not only in mortifications, but also in cases where I conceived the humours might be in a putrescent state; I suspected its virtues might depend on some real antiseptic quality, which would appear by experiments out of the body. For trying of which, having made a tincture of the *bark* in plain water, and observed how long it preserved animal substances from putrefaction, I found that this preparation not only prevented it, incomparably better, than water did alone, but even when nitre or sea salt was added, and that in a larger proportion than the *bark* that

that gave the tincture. I have also found a high degree of antiseptic quality by the like experiments in chamemile flowers. And in both I have observed, a power of sweetning animal substances after the process of putrefaction was actually begun. But as I have not sufficiently repeated these experiments, I will not insist farther on them here.

S E C T I O N VI.

Of the means of preservation.

HAVING finished what I had to say upon the cure of these fevers, I come now to treat of the means of preservation, as far as relates to Jayls and publick Trials.

The Keepers of prisons may be often to blame for their neglects, not only in not continually removing the filth of those places, but in not often enough renewing the straw, which, in the damp and putrid air of a dungeon, must soon rot, and heighten the poisonous quality of the air. For I have observed in a fixed camp, that the rottenness of the straw concurred to affect the health of the men, as was commonly visible
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by a general convalescence, upon changing the ground.

But however careful the Keeper may be in these points, he cannot oblige the prisoners to be cleanly in their persons, much less is he able to preserve the air pure, when crowds of people are pent up in a close place. In which case there is no degree of cleanliness, either of the room or of the persons in it, that can secure them from falling sooner or later into a jail fever, especially if there is any sickness, or putrid sores among them. I have even known the hospital fever begin in crowded barracks, where there was no other distemper; and tho' the men had an opportunity of having fresh air all the day. Such is the danger of breathing in air full of animal steams, which are the excrementitious parts of the humours.

The fault here seems partly to lie in the contrivance of the jails, which never can be so healthful whilst they are too small for the number of prisoners, or too insecure to be without dungeons, and without any convenience of a court for the freedom of air, as

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is universally the way in some countries, and even in some places in England.

But where these conveniences cannot be had, the only resource is in *ventilators*; an invention so evidently useful, and so well known, that it is surprising they should not be hitherto applied to jayls; especially since it is evident what good they have done in ships.

I shall add but one article more, with regard to the prevention of the distemper in prisons, which relates to the care of the sick. It may be known from crowded hospitals, that with whatever distemper a person is seized, the foul air will readily convert it into some degree of the malignant fever, as the strength of nature is then less vigorous, and unable to expel the infection. Whence it is, that in such circumstances almost all distempers are highly dangerous, especially those of a putrid kind: and I take it for granted, that the same misfortune attends jayls. Wherefore, when any under close confinement fall ill, they ought to be removed, not only for their own security, but on account of all those who are with them. But, in the present condition of jayls, there
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may be some difficulty how to dispose of the sick, if numerous; for to attempt to make an *infirmary* in the prison, without *ventilators*, would be to center the poison, and render it more virulent and diffusive afterwards.

Having considered the means for extinguishing the distemper in jayls, I shall next inquire into the best method for preserving other people, when proper measures are not taken for preventing it there. When a criminal, after lying long in a dungeon, is acquitted and discharged, what security is there at present, that he shall not carry the infection to the first house he enters? Or when malefactors are executed, may not their cloaths be as infectious as the tents mentioned in the beginning of this letter? And is it not possible, that malignant fevers may be hereby frequently communicated to the lower people, without their having any suspicion of the cause? And let me add, that in Trials there can be no security against contagion, tho' none of the prisoners are then actually ill of the distemper. For besides, that it may be in the blood for some time, without any apparent symptom; even in an healthful state, the danger is little less from
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their cloaths, which, as we have seen in the instance of the tents, may convey enough of the infection from the jayls to be a ferment in the air of a court, otherwise foul by the respiration of a crowd, during a long Trial.

These things considered, it may appear conducive to the publick security to make the following regulations ; first, to allow no prisoner, upon enlargement, to carry out his cloaths ; which should be burnt, and supplied by others, at the publick expence ; secondly, to order, that the cloaths of malefactors, after execution, should be also burnt : but above all, that before prisoners are brought into the court, they should be cleaned, and put in cloaths to be kept for that purpose, and washed from time to time.

If this method is not taken, the burning of incense in court may be of some small benefit ; but the greatest security would arise from the use of *ventilators*.

As for preservatives to be used by particulars, tho' many of them may be of some service, yet none are infallible. If we suppose the infection communicated by the *saliva*, not to swallow the spittle may be a good pre-

precaution. And to prevent a communication by the breath, a sponge dipt in vinegar has not been improperly used. Neither are medicines of that class called antidotes, to be either relied on, or altogether rejected. I have some reason to think, that a strong infusion of the *bark*, and *serpentaria*, in the *aq. alexiter. spirit. cum aceto* may be one of the best.

There might be place here for inquiring into the other causes which concur with jayls in vitiating the air, so as to make low and malignant fevers more frequent in large and populous cities than elsewhere. Generally wherever there is putrefaction of animal substances, without a free ventilation, there is more or less danger proportioned to the quantity of corrupted matter, and the nature of the season, to promote it. Hence it comes, that open winters frequently prove unwholesome upon this account, but especially uninterrupted hot summers, when the air is not renewed by winds, nor purified by frequent showers. And it might also be proper here to trace the resemblance between the jail fever and the common fevers of the low and nervous kind, which are frequently owing to a putrid cause, either coming from without, or generated within the body. And, lastly,

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to see what analogy there is in the cure. But as handling these points in a proper manner would be inconsistent with our present design, I shall not enter upon them now; and shall conclude with one remark, that altho' I have frequently known fevers of a malignant kind pass from the military hospitals to the towns and villages where they were, yet it has always been with a lesser degree of violence, the contagious matter being weakened, as YOU, Sir, have observed of the plague, by its dispersion. And that tho' I have seen this distemper, perhaps, in its worst state, when it has had many symptoms of a pestilential appearance, yet, as YOU justly remark, there is still a specifick difference; and that therefore we may have the satisfaction to reflect, that the true plague, with its subtile and diffusive virulence, can never be first produced in these climates. I am, Sir, with the greatest respect, &c.

London, May

24. 1750.