

Observations on the typhus : or, low contagious fever, and on the means of preventing the production and communication of this disease / By D. Campbell, M.D.

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OBSERVATIONS

ON THE

TYPHUS,

OR,

LOW CONTAGIOUS FEVER,

AND

ON THE MEANS OF PREVENTING THE
PRODUCTION AND COMMUNICATION
OF THIS DISEASE.

BY

D. CAMPBELL, M. D.

LANCASTER: PRINTED BY H. WALMSLEY,
AND SOLD BY J. JOHNSON No. 72, St. PAUL'S CHURCH
YARD, and J. ROBSON, NEW BOND STREET, LONDON.

MDCCLXXXV.

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LONDON: PRINTED BY W. BARNES,
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MDCCLXXXVI.

P R E F A C E,

*A*T a period, like the present, when the press teems with medical publications, of which so large a portion are on the subject of fevers; it seems in some measure incumbent on the author of the following treatise, to assign his reasons, for soliciting the attention of the public, on a topic which has been so often discussed; and for thus adding another ephemera, to the productions of the season.

A few years ago, a Dispensary, for furnishing the poor of the town of Lancaster, with medical assistance, having been established, by the humanity and liberality, of several respectable and well-disposed individuals; the author of these observations was appointed to superintend it, in quality of physician to the charity. During the last three years, a contagious fever has prevailed, more or less, amongst those persons, who were the objects of this institution; and also at some neighbouring cotton works: in consequence of which, a great variety of cases in this complaint fell under his notice. In the

A 2 course

course of this practice he has so frequently seen the exhibition of Opium, attended with good effects, that he conceived it to be a duty, he in some measure owed to society, to point out the particular state of the disease, and the dose, in which he has found this medicine useful.

Such was the object of the publication: but as this naturally led to an history of the disease, so that of course would refer to the causes, which are disposed to give rise to it; and to matters inseparably connected with them. In order, therefore, to render it more complete, he has added such other particulars, as he judged would elucidate the methods of prevention, or cure of a complaint, which equally attracts the attention of the magistrate, the manufacturer, and the faculty.

He is sensible that many inaccuracies will occur, in what has been hastily thrown together; for which he solicits the clemency of his readers. The nonum prematur in annum, is not applicable to a production, whose design is the early communication, of what has been lately observed.

C H A P. I.

*Of the Circumstances which give rise to the
TYPHUS; or low contagious Fever.*

THAT a particular species of fever, is apt to be produced, in consequence of persons residing in apartments, where there is not a sufficiently free circulation of air; especially if crowded together, and accompanied with neglect of cleanliness, and a deficiency of proper food; repeated experience has so frequently, and so fatally demonstrated, that it would be superfluous to take up time, in adducing instances, where it has so occurred.

The disease, thus generated, has received various appellations. It has sometimes been called the *gaol*, and sometimes the *hospital* fever, from its having originated, or raged with unusual violence in these places. At other times, from a tendency to putrefaction, which has been observed to accompany it, in some situations, it has been denominated a *putrid* fever: and from spots, which in certain degrees of malignity, are
apt

apt to make their appearance, it has been called by the name of *petechial* (or *spotted*) fever: However, as this fever is not peculiar, either to hospitals or gaols, but may be produced in any places, subject to the inconveniences recited above: and as neither *petechiæ* or putrefaction, are essential to the existence of the disease, the addition of such epithets have a tendency to furnish improper ideas, as well as create confusion, by an unnecessary multiplication of names, for the same disorder. All diseases, are disposed to be more violent in some cases than in others, which will necessarily produce a variation in the symptoms, although the causes which gave rise to them, and the general methods of treatment, are the same. Were every diversity of appearance, to constitute a separate disease, the varieties would be as endless, as the distinctions unprofitable.

Dr. *Cullen* has, therefore, included under the general character of *Typhus*, the various species of fevers, which are commonly termed putrid and contagious: because the Doctor observes, “ That many of the different cases
 “ of *Typhus*, seem to be merely varieties,
 “ arising

“ arising from the different degree of power
 “ in the cause; from different circumstan-
 “ ces of the climate, or season in which they
 “ happen; or from different circumstances
 “ of the person affected.” § We shall there-
 fore, in speaking of this fever, either employ
 the technical term *Typhus*; or call it a *low*
contagious fever: a sinking of the *vis vitæ*,
 and *infection*, being two circumstances, in-
 separably connected with it.

Those who labour under this disease, emit
 a certain subtile *effluvium*, which, applied to
 the bodies of persons in health, is capable of
 producing similar symptoms in them: but
 varying probably in some respects, for the
 reasons assigned above.

* This Effluvium, is likewise disposed to
 adhere, to the cloathing and furniture of the
 sick person; to wool, cotton, silk, furs, fea-
 thers

§ First Lines of the practice of Physic § LXXXII.

* “ Air which has been breathed, is made poisonous
 “ to a more intense degree by the effluvia from the sick;
 “ and what else in prisons is offensive. My reader will
 “ judge of its malignity, when I assure him, that my
 “ cloaths were in my first journeys so offensive, that in
 a post

thers, and all articles of the like nature, either in their raw or manufactured state; to the walls and floors of buildings; to the sides and decks of ships: and is also capable of producing a similar disease in persons in health, upon being brought very near to, or in contact with them. The infection is often conveyed by this means, with greater certainty, and accompanied with more violent symptoms, than from the noxious efflu- vium, which arises immediately from the body of the sick person.

The contagion, thus accumulated in foul cloathing, or adhering to furniture, or other articles, of the nature of those, before enumerated, has been called by physicians a *Fomes*.†

It

“ a post-chaise, I could not bear the windows drawn
 “ up: and was therefore often obliged to travel on
 “ horseback. The leaves of my memorandum book
 “ were often so tainted, that I could not use it till after
 “ spreading it an hour or two before the fire: and even
 “ my antidote a vial of vinegar, has, after using it in a
 “ few prisons, become intolerably disagreeable ”

Howard on the State of Prisons. P. 13.

† *Cullen's first Lines. § LXXXVI. and Lind on Fevers. P. 38 and 40.*

It is not always necessary, that they who generate this noxious effluvia, or to whose cloaths it may adhere, should either labour under the disease in question, or have been previously affected by it, in order to possess a power of communicating it to others; as it may happen that persons, whose garments are loaded with this contaminating vapour, may not themselves perceive any inconvenience; although capable of infecting others with a dangerous sickness. This was the case with the felons, who, in the year 1577, at the assizes at *Oxford*; and in the year 1750, at the *Old Bailey*; communicated the disorder in question, in so remarkable a manner. In both instances, the felons being themselves healthy, no suspicion of any danger was excited, until the fatal effects of the effluvia from their persons, were perceived in the sickening of so many of those, who attended these courts of justice. “ For these persons
 “ had been long accustomed to filth and
 “ uncleanness, in consequence of which,
 “ the putrid effluvia, would be generated
 “ gradually, and, for a long time, be con-
 “ stantly applied to their bodies in small
 B quantities

“ quantities, till, at length, it became, as
 “ it were, their natural atmosphere, when
 “ they would no more feel its influence,
 “ than a *Tanner* perceives the smell of his
 “ Tan-yard, or the *Chandler* the smell of
 “ his putrid tallow.”*

It is the same with persons, who have been long accustomed to live in unhealthy situations, in hot climates ; these having been in the language of the country *seasoned*, perceive little inconvenience : whilst a stranger on his first coming to reside there, is almost certain to be affected with a dangerous sickness.

Although the low contagious fever, which is attended with the most malignant symptoms, and strongest marks of infection; and has therefore been the most noticed in its progress, is generally, “ The produce of filth,
 “ rags, poverty, and a polluted air, which
 “ always subsists in a greater or less degree
 “ in crowded prisons, and in all nasty, low,
 “ damp, unventilated habitations, loaded
 “ with putrid animal steams.”† There is
 no

* *Heysham* on the Jail Fever.

† *Lind* on the health of Seamen, P. 2.

no certainty that a similar fever may not be produced by persons, whose manners of living, are in perfect opposition to those, which have been enumerated : or even from the effluvia of persons, labouring under other disorders.

Sir *John Pringle*, mentions his having known “ instances of this disorder beginning in a ward, where there was no other cause, but one of the men having a mortified limb.” †

Dr. *Lind*, adduces some cases where persons were seized with fevers, of this kind, in consequence of being exposed to the disagreeable effluvia, arising from the bodies of people, who were in the Flux, Small Pox, and even in a maniacal state. §

We also know, that what is commonly called a *low nervous fever*, may be produced in certain habits, where the situation of the person, gives no room to suspect, the influence of contagion, in the formation of the disorder ; and whose modes of living, may have been perfectly opposite to those

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that

† Observations on the diseases of the Army.

§ On Fevers, P. 60.

that have been recited, as apt to give rise to infectious fevers. As we hold this to be a species of the same disease, differing, only in degree, from the more malignant cases, into which it sometimes degenerates, it is impossible to say in what circumstances, a fever accompanied with sinking of the *vis vitæ*, may not occur; or at what precise point contagion does not exist, or is incapable of exerting itself.

* *Dr. Howard*, in his *State of Prisons*, has observed that the *gaol fever*, so common in this kingdom, is not to be found in the prisons abroad; although he has seen some of them as dirty and offensive, as in *England*. Several physicians of eminence, also bear testimony, that this disease is not known in *Russia*, *Germany*, *Switzerland* and other foreign countries; probably, they may not be inclined to add this appellation, to any contagious fever, unless it be accompanied with circumstances of extreme malignity.

In the hospitals and gaols on the continent, a disease is however found to exist, especially in the former, called by the French *Le Scorbut*, which is contagious; and has
sometimes

sometimes prevailed in so great a degree, that that no fewer than 800 persons were affected by it, at one time, in the hospital of *St. Louis*, in *Paris**. It was supposed to have originated from want of cleanliness. As the same circumstances, which produce the *Typhus*, are also disposed to give rise to this complaint, it is probable, that what is called *Le Scorbut*, and to which the foreign prisons are subject; is no other than the disease of which we are now speaking, under a different modification, or in a different degree of force, from the climate, diet of the patients, or some other cause; and therefore called by another name.†

All the accounts from *Hungary*, too, inform us, that a contagious fever has appeared in the gaols of that kingdom, (at present filled with prisoners, in consequence of the late insurrection;) which has not only proved fatal to many of those, who are the objects of confinement; but also to
 others

* *Howard*, on Prisons, P. 83.

† *Ibid*, P. 101.

others, whose offices led them to be conversant with the prisoners. As the same causes, are invariably disposed to produce the same effects, there seems to be little doubt, but this, will also be found, upon subsequent investigation, to be an instance of the disease, which is the subject of this treatise, appearing in the gaols on the continent, as well as in this kingdom.

C H A P.

 C H A P. II.

Of the means of preventing the production, and communication of the Disease: and the steps, necessary to be taken, for eradicating it from such articles, as may contain the Infection.

HAVING enumerated the circumstances, under which a *low contagious fever*, most frequently makes its appearance, it will perhaps, be proper to speak immediately, (1) of the means of preventing the formation of the disease, in the first instance: (2) of preventing the communication of the infection to those, who may be exposed to its influence: and (3) to point out what steps are necessary to be taken, to eradicate it from any articles, which may have been infected.

From what has been said, respecting the most common origin of this disease, the means of avoiding those circumstances, which give rise to it, will be sufficiently obvious, and in certain situations easily practised. Thus, as confined air, and want
of

of cleanliness, especially when joined to that low kind of diet, which is commonly termed, poor living, are apt to produce the complaint; it is plain, that promoting a free circulation of air in the apartments where people sleep or reside; the practice of cleanliness in all its varieties, with respect to persons, cloathing, and habitations; the use of a diet sufficient in quantity, and nutritious in quality, with a competent portion of fermented, vinous, or spirituous liquors, (in opposition to low, watery, or crude aliment;) especially if combined with moderate exercise, and good spirits; will contribute much to an exemption from this, as well as many other disorders. † It will likewise be clear, that

† Dr. *Howard*, with great reason, attributes the frequency of this disease in our gaols, to the sudden alteration of *diet*, and *dejection* of the *spirits*, of those, who are newly confined there. Whoever considers the usual habits of such persons, whilst they are at liberty, when every species of free living, especially with respect to liquors, is generally indulged; will immediately see, that the withdrawing so much stimulating aliment, and substituting a low diet, in its place, must induce a temporary debility, with respect to the body, as well as a corresponding dejection of spirits: two conditions, equally favorable

that, whilst the modes of life, generally adopted by persons in better circumstances, are so conformable to these requisites, this disorder can very rarely originate with them : and on the contrary, our gaols, till of late, and the dwellings of the lower class of people, especially in large towns, affording all the conditions, favourable for its production and diffusion, we can easily account for its frequent appearance in these places.

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favorable to the production of the disease ; and to the operation of contagion, if it already exists in the place of confinement. But the lower class of foreigners, not being so apt to indulge themselves in these respects, as our own countrymen, the change experienced by them, upon confinement, in regard to diet, will not be so considerable ; the consequent debility of body and dejection of spirits will be less ; and of course, the disorders arising from these causes, amongst which is a low contagious fever, will not be so apt to be produced in their prisons, as in ours.

How far these considerations, may make it proper to grant an allowance of a moderate quantity of ale or spirits, to prisoners, when any sickness of this kind seems disposed to appear amongst them ; as well as an augmentation of other food ; must be left to the superiour judgment of magistrates, who will be equally cautious, of making gaols the seats of festivity and indulgence, on the one hand ; as of premature punishment and death, on the other,

Where the form of a building admits of the opening of doors or windows, and of burning fuel in open chimneys, a sufficiently free circulation of air, will be easily obtained: but where, from the nature, of the structure, as in the case of cells of prisons, holds of ships, and the like, these conveniences cannot be allowed; the defect must be supplied by contrivances, adapted to the peculiarity of the situation. In general, I believe, it may be most easily, and effectually accomplished, by means of two tubes, of diameters proportioned to the size of the apartment to be ventilated, introduced from without; one of which should enter at the top, and the other at the bottom of the room, at opposite sides. There will then be a pretty constant ingress and circulation of fresh air; for whilst the cool external air will rush in through the lower tube; that which is rarified and thus rendered less fit for the purpose of respiration will pass out, by the other: and through the lower aperture, that portion of air, which is become denser, in consequence of having been received into the lungs, or similarly vitiated, will also have a power of escaping. Farther, if three or four
feet

feet of the bottom tube were to be of iron, and so contrived as to pass through a stove, or place in which a fire might be burnt, it would give an opportunity of introducing the air, when occasion required, in a warm and dry state ; two circumstances as essential to health, in certain seasons and situations, as to comfort ; since we know, that nothing is more apt to encrease the malignity of this disease, than a cold, raw, and damp atmosphere.

Some months ago, a fever of this kind prevailed in the cotton-works at *Backbarrow*, about twenty miles hence, which I was, upon this account, desired to visit. It was evidently of the same nature with that, which had been frequent in other parts of the country, for some time before, and of which we shall have occasion to speak more fully hereafter: so that there did not appear to be the least reason for suspecting it to be peculiar to, or originally produced in the mill (or work-house) ; or in the houses, where the artificers and children are lodged ; which, much to the credit of the proprietors, are airy and comfortable, and afford a striking

contrast to the habitations of other poor persons, whom I have had occasion to see. The same remarks, may be very justly made, with respect to some other works of the like nature, which have fallen under my observation,

I mention these circumstances particularly, because these seems to be a prejudice in the country, against these novel manufactures, which would attribute inconveniences to them and to the working amongst cotton, which in the present instances, do not appear to have any foundation. It is true, that the contagion of several diseases, is capable of adhering to cotton, and of being propagated by that means ; and hence that which is brought from the Levant, is sometimes obliged to undergo the modes of purification, proper on such occasions. This, however, is by no means peculiar to this article, as it is a property it only possesses, in common, with other raw materials, as wool, silk, flax, and the like ; and in no instance do I believe, that any disease has originated from working this valuable commodity ; which by furnishing employment for such
 numbers

numbers of our industrious poor, and producing so many articles, which contribute to the luxury and convenience of others, is so great a source of national advantage.

When any individuals, of a society, which meets daily, in common work-rooms, are affected with a contagious disease, it will unquestionably be more rapidly diffused, and a greater number of persons, will consequently be affected at one time, than would be the case, if the intercourse was less frequent: which, by a cursory observer, might be attributed to other causes. This, however, shews how necessary it is, in works of this kind, to guard against the introduction of any disease, of this nature; and to take the most effectual methods, to prevent the propagation of infection, as soon as its existence is discovered.

About the same time, a contagious fever prevailed in so great a degree at *Radcliffe*, in this county, and in the cotton mills there, as to become the object of the attention, of some very respectable gentlemen, in their capacity of magistrates. As these mills, or factories, are now becoming numerous in

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the country, and individually employ great numbers of persons; any circumstances which may materially affect the health of those, who are engaged in them, are certainly, matters of public concern. Every praise seems therefore due to the magistrates, who, in consequence of the representations that were made to them, have taken such rational and effectual methods, to prevent the production or propagation of disease in these works, by procuring several gentlemen of eminence in the faculty from *Manchester**, to inspect the places, where the sickness was most frequent; and who have, at their request, arranged such directions, as if duly observed, cannot but be productive of the best effects, not only in the particular place, for which they were originally drawn up, and in similar manufactures; but in every other situation, where many persons are employed, in common work-rooms. As with these directions, are also combined observations on defects, in the construction of these buildings, which are frequently met with; and

* Doctors *Percival, Cowling, Easton and Chorley*

and as the class of people who are employed in them, are most subject to the ravages of this fever; I hope I shall be excused for inserting the observations, which these gentlemen have drawn up, with so much perspicuity and judgment.

“ I. All the casements of the windows,
 “ and the three large western doors of the
 “ cotton-mills, should be left open every
 “ night: the same regulations should take
 “ place, during the recess from work, at
 “ noon; and, as many casements should be
 “ kept open, in the hours of labour, as may
 “ be compatible with carrying on the o-
 “ perations of the machinery.”

“ II. The casements are too small; being
 “ in dimension, only about one sixth part
 “ of the window. They are likewise placed
 “ high, and parallel to each other—a posi-
 “ tion obviously unfavourable to complete
 “ ventilation: for the inlet of the air ought
 “ to be lower than the outlet.”

“ III. Several fire places, with open chim-
 “ nies, should be erected, at proper distan-
 “ ces in each work-room. The stoves, now
 “ employed, afford no sufficient passage for
 “ the

“ the offensive vapours generated in the
 “ rooms; and encrease the contamination
 “ of the air, by the effluvia which they emit.
 “ Turf would be the cheapest, and also a
 “ very salutary fuel; for it consists chiefly,
 “ of the roots of vegetables; and yields, in
 “ burning, a strong, penetrating, and pun-
 “ gent smoke, which is likely to prove as
 “ good an antidote to contagion, as that of
 “ wood is found to be, by long experience.”

“ IV. The rooms should be daily swept,
 “ and the floors washed, at least once every
 “ week, with strong lime-water, or with
 “ water strongly impregnated with the
 “ spirit of vitriol, or the acid of tar. The
 “ walls and ceilings may be scraped and
 “ white-washed, at first, every month, and
 “ afterwards, twice or thrice yearly. Lime
 “ fresh burnt, and as soon as it is flaked,
 “ must be used for this purpose, and the
 “ wash laid on whilst it is hot.”

“ V. During the prevalence of the pre-
 “ sent fever, the apartments should be fu-
 “ migated with tobacco. Brimstone might,
 “ perhaps, be more powerful, but, in burn-
 “ ing, it yields an acid, which would be in-
 “ jurious

“jurious to the cotton.”

“VI. * Great attention ought to be paid
“to the privies. They should be washed
D “daily;

* On my first visit at *Backbarrow*, the extremely offensive smell in the rooms, where the manufacture was principally carried on, struck me very forcibly. This I was informed proceeded principally from the *Privy*, the doors of which, for indispensable reasons in the œconomy of these works, where so many children are employed, always communicate with the work-rooms. From the pains which had been taken to keep it sweet, without effect, I am persuaded, that whilst the same radical defect exists, in the construction of these edifices, as was in this, all the efforts of cleanliness will be exerted in vain, in endeavouring to remove the nuisance, which an appendage of this kind may occasion. In this opinion I am the more confirmed, from being informed, that the same offensive smell, is generally complained of in works of this nature: and from a subsequent publication of *Mr. Peel*, one of the proprietors of the mills at *Radcliffe*, who in vindication of the state of these cotton-works, observes, that no offensive smell could proceed from the privy, “because it had been shut up for some weeks;” doubtless, from the inconveniences it had occasioned.

The difficulty of preventing the smell of a privy from being communicated, to an adjoining apartment, is sufficiently known, from the trouble which is often occasioned in keeping a water closet sweet. For the cold external air rushing through the tube, into the warm chamber,
will

“ daily ; and ventilated in such a manner,
 “ that

will carry along with it any offensive effluvia, it may collect, in its passage. This was the case here, but in a degree greater, in proportion to the number of persons, who made use of the privy ; and I suspect cannot be prevented as long as it communicates *immediately*, with the building ; and the fæces fall through *oblique* or *narrow* tubes ; or into a *reservoir*.

If the privy joins *immediately* with the main building, there seems to be no other methods of remedying the inconvenience, but in constructing the tubes *large* and *perpendicular*, and carrying a *stream of water*, through the bottom, of sufficient depth and rapidity, to wash away the fæces, as they fall. This was practised at *Backbarrow*, with the most evident good effects : the rooms which were in the highest degree offensive being instantly rendered sweet and agreeable : and the holes of the privy, from which so much offensive vapour was emitted, now furnish a copious supply of wholesome fresh air, from the surface of the running stream below : and will, I hope, contribute as forcibly, in future, to the preservation of health, as there was reason to suppose they might have done, formerly, to the production or propagation of disease.

Where water, in sufficient quantity, cannot be carried through the bottom of the privy ; this edifice must be separated some yards from the main building, with which it should communicate by means of a gallery ; the sides of which being composed of spars or rails, would prevent

“ that the smell arising from them, shall
 “ not be perceptible in the work-rooms.”

“ VII. The rancid oil, which is employ-
 “ ed in the machinery, is a copious source
 “ of putrid effluvia. We apprehend, that
 “ a purer oil would be much less unwhole-
 “ some, and that the additional expence of
 “ it would be fully compensated, by its su-
 “ perior power in diminishing friction.”

“ VIII. A strict observance of cleanliness
 “ should be enjoined on all who work in
 “ the mills, as an efficacious means of pre-
 “ venting contagion, and of preserving
 “ health. It may also be adviseable to bathe

D 2 the

prevent accidents, and admit a free circulation of air, betwixt the door of the privy, and of the work-room; so that it would be next to impossible, for a perceptible quantity of the putrid exhalations, to enter the latter. The privies to the work-house at *Liverpool*, are constructed upon this plan; and having upon experiment, been found to answer perfectly well, may serve as a pattern for such works, as would choose to adopt this method.

I have been the more particular upon this head, from a conviction, that it is of essential consequence to the health of factories, barracks, and all places where many persons reside, that they should be kept free, from the offensive vapours, which arise from the privies.

“ the children occasionally. The apparel
 “ of those that are infected with the present
 “ fever, should be well fumigated, before it
 “ is worn again. And the linen &c. of the
 “ sick, should first be washed in *cold* water,
 “ lest the steams arising from the heat com-
 “ municate the distemper to the persons en-
 “ gaged in that operation. Crofter's lye,
 “ when it can be procured, is preferable to
 “ water. The bodies of those who die of
 “ the fever, should be closely wrapped in
 “ pitched cloth; and interred as soon as
 “ propriety or decency will permit. Smok-
 “ ing tobacco will be an useful preserva-
 “ tive to superintendents of the works, and
 “ to others exposed to infection, who can
 “ practise it with convenience.”

“ IX. We earnestly recommend a longer
 “ recess from labour at noon, and a more
 “ early dismissal from it in the evening, to
 “ all who work in the cotton-mills. But
 “ we deem this indulgence essential to the
 “ present health, and future capacity for la-
 “ bour, of those who are under the age of
 “ fourteen. For the active recreations of
 “ childhood and youth are necessary to the
 growth

“ growth, the vigour, and the right con-
 “ formation of the human body. And we
 “ cannot excuse ourselves, on the present
 “ occasion, from suggesting to you, who are
 “ the guardians of the public weal, this fur-
 “ ther very important consideration, that
 “ the rising generation shall not be debar-
 “ red from all opportunities of instruction,
 “ at the only season of life, in which they
 “ can be properly improved.”

It is fortunate that this, like most other
 infections, is not communicated, unless by
 the actual contact of the sick person ; of the
 infected cloaths, or *Fomes* ; or at least the
 application of the noxious effluvia, in a con-
 centrated state ; which cannot take place, at
 any great distance, from either the infected
 person or articles. However, what occurred
 at *Philadelphia*, where a fever, of which two
 hundred persons died, was introduced by
 hanging tainted cloaths to air* : and at the
Old Bailey, in 1750, where those persons
 were infected, who were in that part of the
 court, upon which the effluvia from the fe-
 lons,

* *Lind on Fevers and Infection, P. 107.*

lons was carried, by a current of air, from a window, whilst those on the opposite side of the court escaped ; furnish precautions, to avoid the wind, which blows over, and may carry with it, any of the steams, which arise from infected articles.

The readiness with which this disorder is communicated by contaminated cloathing, shews the wisdom of the late regulations, which do not admit felons to appear in the courts of judicature, until they have been previously furnished with new cloaths, and well washed ; by which means, the risk of infection, from any effluvia, that might adhere to their usual dresses or persons, is avoided.

As the effluvia arising from persons in many diseases, becomes sooner possessed of those noxious qualities, which the perspiration of the most healthy is apt to acquire, from long and close confinement ; and when inhaled for too great length of time, or in too concentrated a state, is capable of producing the disease of which we are treating ; it furnishes additional arguments, to endeavour to promote a free circulation of air about those that are sick, by withdrawing

ing curtains, and opening doors and windows, occasionally; as well for their own particular advantage, as the security of the attendants. Upon the same principle may be inculcated the utility and necessity, of changing the linen of sick persons, whenever it is soiled, not only in this, but every other disease. There is a current prejudice against this practice, during the continuance of any acute disorder, for fear of giving the patient cold; or occasioning some, I know not what, injury: than which nothing can be more groundless. No possible harm can ensue from clean linen, provided it be sufficiently dry.

This contagious matter, being of a very subtle nature, is rather traced by its effects, than known by any particular appearances. The *smell*, which accompanies it, is, however, sometimes perceptible. Thus Doctor *Lind*, says, * “ In discoursing with several
 “ who have been infected by patients in con-
 “ tagious fevers, they general^{ly} compared the
 “ first impression to an earthy disagreeable
 “ scent,

* On Fevers, P. 62.

“ ſcent, received into the ſtomach, as from
 “ a grave newly opened, but not quite ſo
 “ raw as the cadaverous ſtENCH; and the
 “ effects of it, ſhivering and ſickneſs were
 “ iNſtantaneous. This is a particular ſmell,
 “ which cannot be well deſcribed, but is
 “ well known to the attendants about the
 “ ſick. Some compare it to that of rotten
 “ ſtraw, or it ſometimes moſt nearly ap-
 “ proaches to the diſagreeable affecting
 “ ſcent, from a perſon labouring under the
 “ ſmall pox, at their turn, tho’ not quite
 “ ſo ſtrong.”

During the laſt winter, whilſt a contagi-
 ous fever was prevalent in the county gaol,
 the caſtle of *Lancaſter*, this particular ſmell
 was very perceptible, near the cells: and
 was not removed, without much trouble.

As, notwithstanding every precaution we
 may inculcate, the diſeaſe will ſometimes be
 produced: and it may not be always in our
 power, to keep at a reſpectable diſtance, from
 infected perſons or articles; it will be proper
 to enquire, (2) what meaſures will be moſt
 likely, to prevent the contagion taking place,
 in perſons ſo expoſed.

Various ſpecifics have been propoſed for
 this

this end ; and if the possession of them, does not induce us to neglect such precautions, as may be deemed indispensibly necessary, the confidence with which those persons are frequently inspired, who make use of them, may be of great moment in producing the desired effects : as it has been observed, that they who have any particular dread of the complaint ; or are under the influence of the debilitating or depressing passions, as grief, fear, or the like ; are more apt to take an infection, than such as have no apprehensions of the kind, or are in good spirits.

Where there is no actual contact of the sick person, or infected articles, it seems pretty clear, that the danger must arise from inhaling the contaminated vapours, either through the nose or mouth, or both : by which means, they are applied to the whole internal surface of the lungs. Hence stopping the nostrils with snuff, tobacco leaves, dofills dipt in camphorated vinegar, and similar substances, upon entering places, where offensive animal steams, or any particular sickness prevails ; and blowing the nose upon coming out, seem rational and

E

necessary

necessary precautions.

For the same reasons, smoking tobacco; chewing *calamus aromaticus*, tobacco, ginger and other aromatic substances, may be very beneficial. There is, however, a precaution, which, whether such substances be held in the mouth or not, should always be kept in remembrance: this is, that the *saliva*, or spittle, should not if possible be swallowed, whilst in these situations. For as the infectious vapours are first received into the mouth, the *saliva* will of course be impregnated, with the seeds of the contagion, and if taken into the stomach, may be the means of giving rise to the disease, by thus introducing into the body the offensive effluvia, now blended with it.

The swallowing a small portion of brandy, or other ardent spirits, either simply in the form of a dram; or impregnated with aromatic or bitter substances, such as garlic, orange peel, peruvian bark, saffron, or snake root, may also be useful upon entering such places; as the infection is so apt to be felt in the stomach, to which organ, and to the mouth and throat, the brandy or tinc-
ture

ture, will, by giving a temporary stimulus, the better enable to resist the impressions of the contagious vapours,

As the contagion is most apt to take place, from the actual contact of the infected articles; it will be prudent to touch as few of the cloaths, of any person who may be sick of this fever, as possible: and of course not to sit upon the bed, whilst paying the necessary visit.

Before we proceed to speak (3) of the methods of eradicating the infection, when it is lodged in cloathing, furniture, or raw materials; or adheres to the walls and floors of buildings, to the decks and sides of ships, and similar articles: it may not be improper to make a few general observations, with respect to those particular circumstances, under which it is found to exist or disappear.

I believe it will not admit of dispute, that a certain combination of causes, is essential to the production of any disease: and that some are, consequently, peculiar to certain climates, seasons, and situations, where only, the necessary concurrence of circumstances takes place. With respect to many of these, the

in the state of the atmosphere, have a considerable effect, in diminishing or encreasing their frequency or violence ; whilst the seasons appear to occasion little difference, with regard to others, especially in the more temperate climates.

The *Small Pox*, for instance, which was unknown to the ancients, and was first observed in *Egypt*, about the sixth or seventh century, is supposed to have originated, in some of the interior parts of *Africa*; whether in consequence of an accidental concurrence of circumstances ; or that those causes which first gave rise to it, still subsist in that country, cannot now be ascertained * This disorder has however never since been produced *de novo* in any other part of the world. Whenever it has made its appearance, it has always been communicated by means of infected goods or persons. It is capable of exerting its contagious properties, in all climates, and in all seasons.

The *Plague* too, seems at present, to be the peculiar production of some provinces situated

* *Mead* on the Small Pox, Chap. I.

situated at the east end of the Mediterranean; whence it is capable of being carried into other countries, and is communicated in the same manner as the small pox. Its contagious properties, however, cease to be exerted, and the disease disappears, in those situations which are most subject to it, when the weather becomes very hot.* I do not know that it has ever made its appearance in the torrid zone: those ravages which have been the subjects of more modern observations, have been confined to the places above alluded to, or to the temperate climates of *Europe*; in which last, it is disposed to rage with greater violence, than in the more southern latitudes, where it is more frequent. This disease, would, probably, be as common in the Christian states of *Europe*, as in the *Turkish*, did not its great fatality, induce us to be extremely vigilant in preventing its introduction: and compell us, from motives of self preservation, to take more effectual methods to eradicate its contagion, than we commonly practice, with respect to the small pox,

* *Russel's History of Aleppo*, P. 227

pox, or other infectious disorders.

It would seem, that a very dry state of the atmosphere, is unfavourable, to the propagation of contagious diseases, as we also find, that during the prevalence of the *Harmattan*, a singular drying wind, that occurs on the coast of *Africa*, a stop is put to the progress of epidemic and contagious disorders ; and that persons labouring under fevers and fluxes, generally recover during its continuance.*

The fatal intermittent and remittent fevers of *Italy*, and the hotter climates, are mostly peculiar to certain unhealthy spots : in some of which, if twenty persons in health, were to sleep a single night, the greater part of them would be seized with a severe and dangerous fever, in the morning. At the same time, places at but a little distance, may be as healthy as any in the globe : and this same spot, at present so noxious, might be rendered so too, by, perhaps, draining an adjoining swamp or marsh, which contaminates the air, with its effluvia, and gives rise
to

*Philosophical Transactions. Vol. 71.

to the disorders in question.

The contagious fever, of which we are now treating, seems to be the production of cold and temperate climates; to disappear in the torrid zone, where its infectious power is at least suspended; and is totally destroyed by a certain degree of heat. Whilst on the other hand, it has been found, that the severest frost is incapable of mitigating the force of this contagion: on the contrary, cold, especially if accompanied by moist and raw air, and damp situations, encreases its powers.*

§ Dr. *Lind* mentions some remarkable instances, where those men who lay within the reach of the smoke of the cook room, escaped the infection of a fever, which raged on board a man of war at *Spithead*: and that the mortality was much greater, amongst some men, labouring under a fever of this kind, who were lodged in a mill, where there was no fire place; than amongst others, in the same disorder, at some old
houses

* *Lind on Fevers and Infection*, P. 20 and 43.

§ *Ibid*, P. 50.

houses, who were not near so well accommodated in other respects, but had the advantage of fires.

Dr. *Blane*, in his treatise on the most effectual methods, of preserving the health of seamen, observes, “ That he has seen so
 “ many instances of crouding and nastiness
 “ in ships and hospitals, without contagion
 “ being produced, and which in Europe
 “ would have excited it, or rendered it more
 “ malignant, that the fact is ascertained,
 “ beyond a doubt. Farther, those ships,
 “ which bring this infectious fever from
 “ Europe, in general get rid of it, soon after
 “ coming to this climate (the West
 “ Indies) and nothing but the highest degree
 “ of neglect, can revive it.”

That the *Yellow Fever*, of the West Indies, which is attended with circumstances of the greatest malignity, and highest degrees of putridity, is not infectious in that climate, seems very clear, from the testimony of gentlemen, who could not have failed observing so striking a concomitant, if it had occurred, in the course of very extensive practice. What Dr. *Lind* mentions on the subject, is very
 singular.

singular. * “ Men of the greatest learning
 “ have frequently disagreed in their opini-
 “ ons, concerning the real or possible ex-
 “ istence of an infection from many distem-
 “ pers : of which the yellow fever in the
 “ West Indies furnishes a very striking in-
 “ stance.

“ Not long since, this fever became an
 “ object of consideration, before the right
 “ honourable the lords commissioners of
 “ trade and plantation, where it was
 “ urged (amongst other reasons for not re-
 “ moving the seat of government and jus-
 “ tice in the island of *Jamaica*, from *Spanish*
 “ *Town* to *Kingston*), that there was danger
 “ from the *Greenwich* hospital, situated near
 “ *Kingston*, of an infection from the yellow
 “ fever being frequently communicated to
 “ that town. On this affair the opinion
 “ was taken of a physician, who had long
 “ practised in that island. And by him it
 “ was judicially and clearly given, that, from
 “ the yellow fever of that island, there was
 “ no infection. This was not only the o-
 “ F “ pinion

* On Fevers, P. 106.

“ pinion of that gentleman in the court,
 “ but is the belief, as I am informed, of the
 “ best practitioners in that island ; as also of
 “ Dr. *John Eliot*, a skilful physician in
 “ *London*, of Mr. *Nasmyth*, and many others,
 “ who have had opportunities of being
 “ well acquainted with the diseases of *Ja-*
 “ *maica*.

“ On the other hand, our *American* co-
 “ lonies are under great apprehensions of
 “ the importation of a yellow fever, in goods
 “ and in ships, from the *West Indies*, by
 “ which they have often suffered. Dr. *Lin-*
 “ *nen*, in his account of the yellow fever, in
 “ in one of your former volumes, supposes
 “ it to be infectious ; others have also been
 “ of the like opinion.—And it is but a few
 “ years since, when a gentleman dying at
 “ *Barbadoes* of a yellow fever, his wearing
 “ apparel and linen, packed up in a chest,
 “ were sent to his friends at *Philadelphia* ;
 “ where upon opening the chest containing
 “ those tainted vestures, the family were
 “ taken ill ; and the cloaths being unluckily
 “ hung abroad to be aired, they presently
 “ diffused the contagion of this yellow fever
 “ over

“ over that town ; by which the gentleman, who furnishes me with this relation, was an unhappy sufferer, and of which upwards of 200 persons died.”

Now, these seeming contradictions, are easily reconciled, if our position be just.

The contagion of this fever, is disposed to be active in cool and temperate climates. If it be transported to the hotter climates of the West Indies, by persons labouring under it ; those contagious properties, for which it is so remarkable here, cease to be exerted ; nor has the infection contained in cloaths or other articles, its usual effects. Farther the most malignant fever of that country, which is attended with circumstances, that would indicate the greatest likelihood of contagion with us, is at least so seldom infectious there, that the occurrence is totally denied by those, who have had the best opportunities, of making observations. But take the cloaths, impregnated with the effluvia of persons, who have been sick of this very fever, into a more temperate climate ; and they are then capable of shewing contagious properties, and of communicating an infectious fever, in its most virulent and

dangerous forms.

That the contagion of fevers, is totally destroyed, by a certain degree of heat ; and that far short of injuring the texture of woollen or linen cloaths, seems clear: but the precise degree which is capable of producing this effect, has not been ascertained by a Thermometer, that I know of.

Dr. *Lind*, (to whose judicious reflections on this subject, we are so much indebted), observes, that he has seldom or ever known a proper application of *fire* and *smoke*, to be unsuccessful in producing the happy consequence, of effectually purifying all tainted places, materials and substances ; the judicious application of which, he considers as the true means, appropriated for the destruction and utter extinction, of the most malignant sources of disease.

The smokes, which he recommends for this purpose, are those of *tobacco*, *brimstone*, *arsenick* or *gunpowder* : how far these are endowed with powers superior to the smoke from many other substances, I cannot determine ; but from their peculiar pungency and other properties, they may, perhaps, be disposed

disposed to act *chemically*, upon the contagious matter, and thus prove additionally useful, in occasioning its destruction.

The smoke from burnt wood, has been recommended, as particularly useful for this purpose: but that this, however durably and plentifully applied, is of itself inadequate to the effect, is evident from the circumstance of a fever of this kind, being the epidemic disease of the Highlanders in *Scotland*; although it is well known that every part of their houses, furniture, cloaths and persons, are penetrated by, and (if I may be allowed the expression,) steeped in the smoke of *peats*; which are composed almost wholly of the roots and fibres of vegetables.

The fumigation powder used by the *Russians* at *Moscow* in the year 1771, to prevent and destroy the infection of the *Plague*, was composed of *Sulphur*, *Nitre* and certain *resinous* and *aromatic* substances; which last was thought by some, who had the best opportunities of making comparisons, * only to enhance the price, without adding any thing

* *De Mertens, de Peste.*

thing to the efficacy of the fumigation ; which differed nothing, materially, in the manner of its application, from that recommended by Dr. *Lind* for destroying other infections.

It would certainly be very desirable, if we could say, that by any process, we could eradicate every particle of contagion, contained in a given portion of infected cloaths. This is well known to exist, sometimes, in a very minute form ; and if the application of the *smoke* of particular substances, be alone adequate to this effect ; who can be certain that it may not lurk in the fold or seam of a garment, and thus escape our endeavours to destroy it ?

I confess I am inclined, upon taking all the circumstances together, to believe that more is owing to the degree of *heat* applied, than to the effects of mere fumigations ; however as some of these smokes are possessed of very pungent qualities (especially those of Sulphur and Nitre) and are besides recommended upon such respectable authority, I would by no means advise the omission of them, until it shall have been fairly decided
by

by experiment, how much of the purification of infected articles, depends upon the *smoke* arising from these substances ; and how much upon the degree of *heat*, to which they may be subjected.

§ I should however think that including for some hours, in an *oven* properly heated, such articles either linen or woollen, as are supposed to contain any taint, would be a necessary precaution, previous to their being delivered to be washed or scoured. A gentleman, upon whose information I can place the greatest confidence, has acquainted me, that in the case of a family, who had been severely handled by an *ulcerated sore throat*, they had afterwards taken the precaution of applying heat, to such articles as had been near the sick, by shutting them up for a few hours, in an oven ; which was attended with the most beneficial effects in destroying the contagion. The disorder, however, was reproduced in the family, and being traced to its origin, was found to have taken its rise again, from a stuffed dog, which had
been

§ *Howard on prisons*, P. 45.

been the plaything of one of the children, and had been neglected to be included in the oven, with the other articles.

I have of late, recommended in all possible cases, this mode of applying *heat*, to the cloaths which have been used by the sick ; and have had no reason to doubt of its efficacy in destroying any contagion which might adhere to them : the principal difficulty, which occurred on this head, was in obtaining permission of the proprietors of ovens, to allow them to be used for this purpose.

Supposing a house or ship to contain the infection of a contagious fever, the modes of purification will, then, be briefly these.

Every method is to be pursued to introduce and promote a free circulation of air, by opening the doors and windows ; and lighting fires in open chimneys : and when this cannot be done, by the application of the tubes, (Page 18).

All the varieties of cleanliness are to be practised, by scraping the floors of houses, and the decks and sides of ships, and washing them first with soap lye ; and afterwards
with

with vinegar, or spirit of vitriol and water.

The walls of houses are also to be scraped, and a wash of lime and water applied; the lime being recently flacked, and laid on whilst it is hot. After which the farther destruction of any contagion, that might escape these processes, is to be attempted by the proper application of *fire* and *smoke*.

* “ There are three methods commonly
“ practised, for purifying ships or vessels
“ after the company has been removed out
“ of them.

“ The first is by burning of *tobacco*. A
“ quantity of tobacco is spread on several
“ fires, made with such pieces of old rope,
“ as are called junk. These fires dispersed
“ into different places of the ship, their heat
“ and smoke are afterwards closely confined
“ below for a considerable time.

“ The second method is by charcoal fires
“ strewed with *brimstone*. The heat and
“ steam of these burning materials for this
“ purpose, must likewise be long and close
“ shut up.

G

“ The

* *Lind on Fevers, P. 44.*

“ The third method of purification is
 “ performed, by the addition of *arsenick*, to
 “ the materials of the second process, in the
 “ following manner. After stopping up all
 “ the openings, and every small crevice of
 “ the ship (as was also necessary in the pre-
 “ ceding process), a number of iron pots,
 “ properly secured, are to be placed in the hold,
 “ orlope, gun-deck, &c. Each of these are
 “ to contain a layer of charcoal at the bot-
 “ tom, then a layer of brimstone, and so
 “ alternately, three or four layers of each;
 “ upon which the arsenick is to be sprink-
 “ led, and on the top of it some *oakhum*,
 “ dipped in tar, is to be laid to serve as a
 “ match. The operators upon setting fire
 “ to the oakhum must speedily leave the
 “ place, shutting close the hatchway by
 “ which they came up.”

In all these cases, great caution must be
 used, upon re-entering the holds of ships so
 fumigated. The hatchways, ports, win-
 dows, &c. should be thrown open, for a day
 or two, before, any person can safely ven-
 ture down.

The process for purifying an infected a-
 partment

partment, or house, is precisely similar to these: and the same precautions, are of course necessary, upon re-entering it.

* In another place, the same respectable author recommends the smoke which arises from the burning of *gunpowder*, when it has been made into a paste by wetting it, for the same purposes; and applied pretty nearly in the same manner.

Cloaths, bedding, and other articles being allowed to remain in a ship or room, thus heated and filled with these pungent vapours, will stand a good chance of being freed from any infection which may adhere to them: after which, they may ~~may~~, for still farther security, be washed in *cold* lye, previous to their being put into hot water.

These various methods of prevention and purification, may be readily and effectually practised upon the cloaths, furniture and apartments of persons in certain situations in life; and upon shipping, public buildings, and factories: but it is still to be feared, that notwithstanding every precaution, which

* *Dr. Lind.*

may be enjoined the poorer classes of people ; yet, while their wants necessitate them to the modes of life that generally obtain amongst them, the spreading of a contagious disease, once introduced into a family, or even a community, seems almost unavoidable. Crowded together, in small, and frequently dark, or damp rooms ; those in health often sleeping in the same bed with the sick, from a want of any other resting place ; without that change of linen which contributes, at once to the luxury and health of those in more affluent circumstances : we must, whilst we deplore our inability to apply the same successful modes of prevention to them, as to those in other situations, be content to endeavour by charitable and medical assistance, to alleviate those ills, the existence of which, is inevitable ; and will probably be rendered still more severe, by the continued application of the causes, which either give rise to, or encrease the malignity of the disease.

 C H A P. III.

An account of the TYPHUS, or low contagious Fever, as it appeared in the town and neighbourhood of LANCASTER in the years 1782, 1783, and 1784.

A Fever of the particular species, which is mentioned in the foregoing chapters, was epidemic at *Carlisle*, in the year 1781*, but I did not see any person affected with this disorder at *Lancaster*, until the summer of 1782. Whether it was originally produced here, or imported from a distance, I was unable to ascertain; the houses in which it first appeared, being equally favourable for either supposition. From that period to the present, it has continued to rage, with more or less frequency and fatality.

It has with very few exceptions been confined to the poor and labouring classes of people: but when persons in better life were

* *Heysham* on the Jail Fever.

were attacked, the symptoms were not less severe than with others. The seasons or weather, seemed to have little influence either in extending, or retarding its progress: sometimes we had many persons labouring under the disease; at other times, it would almost totally disappear, and then break out again; generally in families, whose intercourse with others, who had been sick, afforded a ready conveyance for contagion.

Some months ago the same disease raged with uncommon severity in the neighbouring town of *Ulverstone*, and in various parts of this county: and appeared about the same time, in the cotton-works at *Backbarrow*.

The number of persons in this complaint who have fallen under my observation in *Lancaster*, is about five hundred, of whom thirty-four died: which is upon an average, rather more than one in fifteen.

Of these, one hundred and sixty-eight were *men*, whereof have died twenty, which is nearly one in eight.

Two hundred and thirty-six were *women*, whereof have died eleven, which is about one in twenty-one.

Ninety-

Ninety-four were *children* under 14 years of age, whereof have died, at most only three; that is one in thirty-one. But with respect to two of these there was from their tender ages, and other circumstances, some ambiguity, as to the identity of the complaint, which was the cause of their deaths.

At the factory or cotton-mills at *Backbarrow*, the total number of persons, who have been affected with this fever, is one hundred and eighty, of whom seven have died: which is upon an average, about one in twenty-six of the whole.

Of these, thirty-eight were *men*, of whom five died, being rather more, than one in eight.

Eleven were *women*, of whom two died, making rather more than one in five.

One hundred and thirty-one were *children*, under 14 years of age, of whom, none have died.

Taking the sick persons at both places, their numbers, and average of deaths, in each class, will stand as follows.

Men, 206, Dead, 25, rather less than 1 in 8.
 Women, 235, Dead, 13, more than 1 in 19.
 Children, 225, Dead, 3, about 1 in 80; upon the most unfavourable supposition, but, perhaps not 1 in 120.

The

The average of deaths upon the whole number, will be not quite 1 in 16.

From the above state, we see how much more dangerous, the disorder proved to men than to women ; (the number of the latter at *Backbarrow*, being of themselves too few, to contradict the general average,) and how seldom it proved fatal to children : forming in this respect a striking contrast to the *ulcerated sore throat*, where the concomitant fever is a *typhus*, and requires the same general methods of treatment with this.*

Notwithstanding children mostly got through the complaint, the disease frequently handled them with great severity ; the time of confinement to their beds, being long, the symptoms violent, and the subsequent emaciation and weakness considerable.

§ Dr. *Cullen's* generic definition of this disease is “ That it is contagious : that the
“ heat of the body is very little encreased ;
“ that

* *Fothergill* on the Sore Throat. P. 11.

§ G. V. TYPHUS.

“ Morbus contagiosus ; calor parum auctus ; pulsus
“ parvus, debilis, plerumque frequens ; Urina parum
“ mutata ; sensorii functiones plurimum turbatæ ; vires
“ multum imminutæ.”

“ that the pulse is small, weak, and for the
 “ most part frequent ; the urine but little
 “ changed ; the functions of the brain very
 “ much deranged ; and the strength of the
 “ body much diminished ;” all which cir-
 cumstances were found to occur in the course
 of this fever.

Those who were attacked perceived pains
 in the back, about the loins ; and in the
 limbs ; a giddiness in the head, as if under
 the effects of intoxication ; a listlessness and
 aversion to motion ; want of appetite ; dis-
 agreeable taste in the mouth, accompanied
 with thirst ; sometimes coldness and rigors,
 with alternate flushings of heat. In this
 state they frequently remained several days ;
 generally without either applying for medical
 assistance, or taking to their beds.

Under the influence of this first attack, it
 was not uncommon for them, (especially the
 men,) to go to their usual occupations ; mis-
 taking the symptoms of the disease for a
 slight cold, or what they termed *laziness*,
 which was to be got the better of, by appli-
 cation to work : however where violent ex-
 ertions were made, under these circumstances,

the disorder suddenly encreased, and generally terminated fatally.

This state of attack was mostly noticed by the family, who would inform you, that the patient had *complained*, two or three days (as it happened) before he was quite ill and obliged to take to his bed.

The nights, in the beginning, were generally passed in a state of drowfiness and dreaming ; and were productive rather of fatigue than refreshment.

In the progress of the complaint, a general restlessness and uneasiness became more evident and troublesome ; accompanied by a disposition to be disturbed by dreams, which were often frightful. If the patient lay still a little while, as if asleep, he generally awoke, starting up, alarmed, and for some time in a manner delirious, until he was convinced that what he fancied had occurred, was only in the course of dreaming. The confusion of the head became more permanent, accompanied with complaints of noise and ringing in the ears ; and a tendency to be affected with nausea and sickness. The whole head was frequently affected with pain, but especially

pecially above the eyes, where it was often acute. The *cheeks* were in many instances flushed, the redness circumscribed, and in appearance much like that which occurs in hectic or pulmonic complaints. The *eyes* assumed a dull muddy look, which upon nearer inspection, appeared in a great measure owing to the vessels of the *adnata*, being filled with the red fluid, as in some cases of *ophthalmia*. The *tongue*, which was generally dry, and often hard, was sometimes moist; sometimes covered with a whitish or brown fur; sometimes a stripe of a brownish colour in the middle, and of a natural appearance at the sides: at other times tho' of a natural colour, the surface was shining and as it were glazed; and sometimes as hard and rough as a fish skin, and the patient, with great difficulty understood when attempting to articulate. These two last mentioned appearances, generally occurred, towards the fatal termination of the disease.

As the complaint advanced, the restlessness and uneasiness encreased; the patients were continually turning and starting; often moaning and complaining to themselves;

and if they fell into a short slumber, when they awakened, they would frequently raise themselves erect in bed, and attempt to get up. Their actions were, although sometimes quick, yet always weak ; and their exertions not long continued. Upon being spoken to, they for the most part, would answer questions tolerably rationally, but soon fall again into the same rambling muttering way.

The *pulse* during all this time, was generally small, weak, and very frequent ; from 100 to 120 or 140 strokes in a minute.

The *urine* varied but little from its usual appearances ; it was mostly of an amber, or rather paler colour : there was seldom any sediment, but frequently a cloud was suspended, in which small black specks, might be seen.

The *belly* was sometimes costive ; and at other times a considerable, and debilitating looseness attended it.

The *skin* was generally dry ; and at other times a gentle diaphoresis attended the whole course of the complaint ; and sometimes profuse general sweats ; these last, were however

ever for the most part, confined to the breast and head.

In the progress of the disease, if it terminated fatally, the delirium became more confirmed; the patient was more uneasy, spitting out, and refusing to swallow, what was offered to him, whether food or medicine; frequent twitchings and tremors occurred, which with a lifeless dull eye, with fordes about the edges, and the *adnata* discoloured by a red suffusion; the mouth and teeth, black and furred; a tremulous intermitting pulse; deafness; and inability to articulate, generally closed the scene.

Such was the most general succession of symptoms; but sometimes after the first attack, the disorder wore rather a different aspect: the weakness and inclination to be still and quiet, being more perceptible, as well as a greater disposition to be sick and faint, upon being moved. The face was rather pale and sunk. The delirium that occurred was now of the low and muttering kind. The tongue inclined to be moist, with *aphthæ* on its sides, and on the interior parts of the cheeks and lips. All the symptoms of debility were
more

more strongly marked ; and it was in these cases, that *Petechiæ* most frequently made their appearance, which were sometimes of a bright red colour, at other times purple, and in a few instances quite black

Although the pulse, was in general frequent, to the degree I have mentioned, this was not universally the case. In one woman who died covered with *Petechiæ*, and who for several days had been in such a comatose state, as not to be able to take either food or medicine, the pulse was never more frequent than 66 strokes in a minute. In another woman who also died, under similar circumstances, the pulse until the day preceding her death, never exceeded 72 strokes in a minute ; and about a month ago I saw a woman at *Backbarrow*, who had been ill three days, and had then taken to her bed, with all the symptoms of formed fever, such as pains in the small of her back and limbs, head-ach, sickness and thirst, whose pulse beat exactly 68 strokes in a minute.

It was no uncommon circumstance, for convulsive twitchings to occur early in the complaint, which were stronger, and there
were

were more of the muscles brought into contraction, than in the case of *subfultus tendinum*, which is apt to come on, at the close of these fevers. Sometimes also a hiccup, which was often obstinate. And in some the pupil of the eye appeared uncommonly dilated, as in the *Hydrocephalus internus*; and where this was the case, convulsions, or a fatal stupor were apt to supervene.

Deafness, was very common, both in those who recovered, and those that died; but it was generally more complete, in the latter termination.

Two cases occurred where the patients lost the powers of articulation, together with that of hearing; although they appeared to understand, by signs, what was wished to be communicated to them. Both these cases terminated fatally. One of them, remained near a fortnight, in this state, after the symptoms of fever had subsided.

Hemorrhages from the nose were frequent; in some instances very profuse: and I believe the death of one patient, was owing to the weakness brought on, by this evacuation.

The same disposition to effusion of red
blood

blood also occurred in other parts, especially from the *gums* : and the breath was rendered highly offensive, in consequence of that which adhered to the teeth, and other parts of the mouth, becoming putrid.

One patient was carried off by a most profuse hemorrhage, from the intestines, after the fever had left him ; and another by repeated smaller evacuations of the same nature. In this last case, there was an evident hardness on one side of the abdomen, which from its foreness and other circumstances, appeared to be the source of the hemorrhage.

In one case, which also terminated fatally, there was a remarkable vomiting of a matter which in appearance resembled coffee-grounds ; but without any fetor.

In two cases in the same house, the head did not appear considerably affected ; but there seemed to be a fatal determination to the lungs, accompanied by wheezing, and a considerable expectoration of concocted and frothy matter, as in the *Peripneumonia Notba*, or *Catarrhus senilis* ; and with that leaden cast of the complexion, which is observed

observed in such affections. Both these patients died with marks of pulmonic congestion, and subsequent suffocation.

Although I looked with the utmost anxiety for *critical days*, and for *intermissions* or *remissions*; I cannot say I ever perceived that the complaint was disposed to shew any of these appearances, except at the very beginning, when, after the exhibition of an emetic, I have thought there was some abatement of the symptoms. The disease was sometimes of greater and sometimes of less duration, as well as violence; and the return to health was generally gradual, without those remarkable changes, which are observed in fevers, that are disposed to assume a remittent or intermittent type.

The same may be said of the *calor mordax*, which I never could distinguish, separated from that disagreeable heat, which is commonly perceived, upon touching the skin of persons, who labour under any kind of febrile indisposition.

The *Prognostics*, were generally to be drawn from the degree of the affection of the *brain*. If this kept tolerably free from
I delirium,

delirium, and the patient could also take food and medicines, but especially the former, the event was generally favourable. However, if other *viscera* essential to life, were considerably disordered, the danger was equally great, although the brain might not be primarily, or principally affected. But for the most part, the danger or safety of the patient, was to be estimated, from the functions of the *Sensorium*, being more or less disordered.

Towards the fatal close of all diseases, the symptoms are in general, so much alike, and so irremediable, that those which occurred here, at that period, scarcely deserve a particular enumeration, or attention.

The patients, when they began to recover, after the violence of the fever had abated, were generally in an extremely weak and emaciated state; and required much care and attention, with respect to exercise, food, and exposure to the air, to prevent a return of some dangerous symptoms. I have seen several of these, left in so great a state of debility, as to be literally, scarcely alive; being apt to faint when any attempts
were

were made to alter the position, especially to set them in an erect posture : the pulse weak, and beating scarcely 60 strokes in a minute, as if the exertions of the heart and arteries were barely sufficient, to carry on the circulation ; the voice feeble and drawling ; and the eyes hollow and languid. These were generally cases where the head had been much affected, and other symptoms had been violent.

In an instance of a fever of this kind, some years ago, a fatal *delirium* was brought on, after the patient appeared to have every symptom of recovery, in consequence of reading, and attempting to answer a long letter, on intricate business ; a circumstance which shews how necessary it is, to guard against the effects of exertions of the mind, as well as of the body, when the strength is so much reduced, as it generally is in these fevers.

C H A P. IV.

Of the Cure.

AS I considered this fever, to be perfectly analagous to that, which attends the *ulcerated sore throat*; I set out with the same general plan of cure, as I had experienced to be successful in that disorder; and upon this principle, holding evacuations as pernicious, and tending to encrease that state of debility, which accompanied, and gave a dangerous tendency to the complaint, I endeavoured to support the strength of the patient by means of *tonic and cordial medicines*, and a *nutritious diet*. With this view, I gave the *Cortex* in substance, as frequently and in as large doses as the stomach would bear; and *wine* freely, either by itself, or mixed with water, or in sago or other gruels, as it seemed most palatable; in the quantity of which I was only limited by the effect. In general an ounce of the *cortex* and about a bottle of wine, was as much as could be conveniently taken in one day; but

but if relief from sickness or faintness, or any other symptoms ensued, I never stinted the dose; on the contrary, the difficulty was to induce the attendants to give the wine, in sufficient quantity. In one case that fell under my care about eight years ago, of a lady in an *ulcerated sore throat*, two bottles of madeira, and two of port wine, were taken in twenty-four hours, exclusive of a quantity of *Huxham's* tincture of the bark, *Confectio cardiaca*, and other cordials, with the most evident good effects. Since which time I have not had the least scruple of prescribing wine, liberally, in fevers of a low kind or putrid tendency * In short, the quantity necessary seems to be in proportion to

* I do not by this mean to insinuate, that the exhibition of bark in large doses, and the free use of wine, in fevers of a low kind, and of a putrid tendency, originated with me. It was a practice that was inculcated in the schools of physic at *Edinburgh*, as long ago as the year 1768, and probably before that period. I have adduced this instance, to shew that very large quantities of wine, may be given in these cases, with advantage: and I mention it particularly now, because I understand that the origin of this practice, is attempted to be referred to a much later date.

to the degree of weakness that occurs ; in which case, as the relief obtained is generally obvious, the frequency of the repetitions of this cordial, will be indicated in proportion to the recurrence of faintness, and other symptoms of debility.

If a *Diarrhœa* supervened, a quantity of *Confectio Japonica*, (or some medicine of a similar nature) was added, sufficient to check, or at least moderate the evacuation ; which as it only tended to encrease the prevailing debility, and never that I could observe, even when the head was affected, gave any relief, I always considered as a morbid and dangerous symptom ; especially if the evacuation was considerable, and protracted to any length of time. Similar sentiments upon this subject have been entertained by others.* I have however frequently seen patients, three or four days without a stool, and no bad consequences ensue ; on the contrary, a costive habit was upon the whole, rather a favourable occurrence. If any uneasiness appeared to be occasioned, by the retention

* *Heysham* on the Jail Fever. P. 54.

retention of feces, it was easily obviated, by an emollient glyster.

Sir *John Pringle*, observes that some persons, who were infected by the felons at the *Old Bailey*, escaped without a fever by a looseness coming on. This was however in the beginning of the disorder and might carry off the noxious effluvia that had been received into the stomach ; and its effects be in some respects similar to those, produced by an early emetic, of which we shall have occasion to speak hereafter.

If the pain in the head encreased, and became very troublesome ; I have often seen it relieved, by rubbing the forehead and temples ; or finally, if more obstinate, the whole upper and posterior parts of the head (shaved) with an embrocation, composed of, two ounces of *camphorated spirits of wine*, and three drams of *vitriolic æther*. When the disorder appeared to be disposed to affect the functions of the *sensorium* considerably, I thought shaving the head necessary, especially in the cases of men, (where the danger is proportionally so much greater) to make room for the early application, of a large
blister

blister, which I have frequently seen followed by good effects. If the head-ach then was considerable, with tendency to delirium, and no relief was obtained by the above embrocation, a blister on the upper part of the head, or the nape of the neck, was often of service, in moderating or removing these symptoms.

In the course of the complaint, it frequently happened that the stomach partaking of the general debility of the system, could not retain the *cortex* in substance; and at length contracted such an aversion to it, that the farther exhibition of it, became impossible. No sollicitations could induce the patients, in many instances, to comply with the requisitions to take it, either regularly, or in quantities, from which its proper effects could be expected; or if forced down, it lay heavy and painful at the stomach, and was, after a while, thrown up again; by which means the tendency to *nausea* was increased, and the patient hurried by the operation.

Under these circumstances I had recourse to the following *formula*, which I now commonly use in this disorder, for supporting
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the *vis vitæ*, and correcting any disposition to putrefaction, that there may be in the *primæ viæ*; and which purposes I have found it to answer extremely well: and besides, it not only sits easy on the stomach, when the bark in substance will not, but also helps to correct the tendency to nausea and vomiting, which so often occurs.

*R. Cort. Peruviani rubr. contus. unc. i.
Coque in aq. fontan. lib. ii. igne lento ad lib. i.
Cola et fiat Decoctum.*

R. Decocti superioris unc. vi.

Tinctur. Cort. per. comp. unc. ii.

Elixir Vitrioli acid. drach. i. M.

*Capiat aeger Coch. ii. vel iii. omni biborio
vel triborio.*

If a greater degree of faintness than common was perceived, the elixir of vitriol was exchanged for *Spt. Vol. Aromatic. dr. ii. vel iii.*; though it did not then appear to be equally palatable, or grateful to the stomach.

If the sickness and tendency to nausea, was more urgent, and the thirst considerable, with a hard dry tongue; the elixir of vitriol was left out, and to a dose of the above medicine, a scruple of the salt of wormwood

was added, and given with a spoonful of lemon juice, in the act of effervescence.

I have also given in the beginning of the complaint a mixture of *Spiritus Mindereri*, and *camphorated julep*, every two or three hours, with a view to promote a diaphoresis; which intention, it answered very well: but except in the very beginning, I have no reason to speak of it, as being productive of any particularly good consequences.

Having, when the *red bark* was first introduced, found that half an ounce, was adequate to the removal of a tertian ague, (which disorder was then very frequent in this country,) as effectually, as double the quantity of common bark; I have always made use of it since, in preference to the other. After taking notice of the bad consequences of a *diarrhœa*, it seems almost needless to add, that when that effect was produced by the *cortex*, it became necessary to add 5 or 6 drops of *laudanum* to each dose of this medicine; or a sufficient quantity of *confectio japonica*, or some other preparation of a similar tendency, to suspend, or moderate the evacuation.

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The useful exhibition of *tartar emetic*, or any medicine that has a tendency to excite vomiting, I have every reason to believe, is limited to the very first attack of the disease. If an emetic be given when the head-ach, shivering, bad taste in the mouth, want of appetite, or pains in the limbs, first come on; and be followed by some white wine whey, with a teaspoonful of spirits of hartshorn, or some other volatile; or by a dose of the julep before-mentioned, with thirty or forty drops of *laudanum*, (especially if the pains in the limbs, or any other symptoms be considerably troublesome;) so as to excite a copious diaphoresis, I believe this fever may be often literally nipped in the bud. It was in this way and at this period, that Sir *John Pringle*, found emetics useful.* An ounce of the *cortex*, should, if possible, be got down in the course of the ensuing day; and repeated on the three or four succeeding ones.

In more advanced stages of the disease, in those instances, where I saw emetics exhibited, they were attended with evidently bad

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effects;

* Observations on the diseases of the army, P. 306, 307.

effects ; by fatiguing the patient, and inducing a long continued nausea and puking, and sometimes a looseness; all which contributed to encrease the prevailing debility.

When wine could not be got down, in sufficient quantity ; turned sour on, or disagreed with the stomach ; or was not to be obtained ; a spoonful or two of any spirituous distilled water, as the *aqua nucis moschatæ*, or *aqua juniperi composita*, mixed with a little sugar and water ; or simple brandy or rum, in the same manner, were attended with good effect : and some persons got well through the complaint, who took nothing but these compositions, in moderate quantities. We had however instances of two men, who upon their beginning to recover, brought on fatal deliriums, by drinking too freely of undiluted spirits.

This course was attended with most evident service, when the symptoms were moderate, and the *delirium*, if any occurred, was rather of the mild, low, and muttering kind, in opposition to a restless uneasy state of the same nature, attended with quicker motions ; when the tongue was moist and
furred,

furred, or *apthæ* appeared, in opposition to a hard or dry tongue; when there were *petechiæ* or hemorrhages; and when the marks which characterize debility, were particularly striking. But in the progress of the disease, the plan we have just now laid down was interrupted, and obliged to be varied because it seemed, in whatever manner put in practice, to be inadequate to the removal of a particular set of symptoms, which frequently appeared. Further I thought that when the delirium was attended with a hard dry tongue, and quick motions, that these symptoms were increased by the exhibition of bark and wine: but whether this might have arisen, from not being able to throw them in, in sufficient quantities, I cannot say, as under these circumstances, it was very difficult to induce the patients to swallow any thing bulky, or that was disagreeable to the palate. However the same inconvenience from the use of wine has been remarked by Sir *John Pringle*. §

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§ Observations on the Diseases of the Army, P. 316.

The case to which I allude and which so frequently occurred, is as follows.

After the symptoms of the first attack, such as lassitude, shivering, pains in the back, limbs and head, the patient takes to his bed: his nights are passed without sleep; or if he falls into a short slumber, he awakes disturbed by some unpleasant dream; he starts up and wants to get out of bed; he is continually turning and changing his posture; complains much of pain, or confusion in his head; of noise in his ears, and thirst. His tongue is either dry and hard, or covered with a thick, disagreeable brown fur. His eyes begin to grow muddy, and assume a dull look. The pulse is about 120 strokes in a minute, and small. The skin dry, or bedewed with partial sweats, which produce no alleviation of the complaints. These symptoms continue, and grow more alarming; uneasy days succeed to restless nights; the patient is exhausted by pains, and by watching; the inclination and ability to take nourishment, diminishes; the delirium, which for a while, only took place upon coming out of his slumbers, is now more constant;

stant ; and if some means cannot be found to interrupt the progress of the disease, slight convulsions, total refusal of food, and insensibility, are certain to ensue ; which with cold extremities, and involuntary evacuations, close the scene.

In this state of things, I have too frequently seen all the usual practice exhausted, without success. The *bark* has been given, in as large doses as the patient could take, and repeated as frequently as the stomach would admit ; *wine* has been given freely ; *camphor*, *castor*, *musk*, *contrayerva*, and the whole train of nervous stimulating medicines, have been exhibited ; these have been joined to, or exchanged for *antimonials* and *James's powder* ; *blisters* have been applied, repeatedly ; also *pediluvia*, and warm fomentations to the lower extremities. The only alleviation of the symptoms in such situations, which seemed fairly to result from these medicines or applications, sometimes followed the exhibition of musk, and the application of blisters to the head or neck ; or the use of the pediluvium, or fomentations, applied by means of flannels, wrung out of
warm

warm water, to the lower extremities. The good effects of these remedies proved however generally of short duration; and were too often looked for in vain.

At length tired with being so repeatedly disappointed, in my expectations of the good effects, that were to have resulted from these medicines and applications, I had recourse to *Opium*, which I heard, had been given in very large doses, in this fever, at *Edinburgh*; and from the great variety of cases in which I have tried it, I can venture to recommend it, as a most valuable medicine, where the brain is so much affected, that delirium actually exists: but particularly, for removing or at least greatly relieving that restless and uneasy state, which is so apt to exhaust the patient with thirst, pain, and watching, and to terminate in delirium. In short for mitigating those symptoms which give a violent form, and dangerous tendency to the disease.

As the accounts of the effects of the large doses of opium, which had been given in these cases of *typhus*, were at least contradictory, I was solicitous, on my first exhibiting this medicine, to see what authorities could be adduced

adduced in support of the practice: and in what doses it had been given, when the complaint was more strictly febrile.

* *Sydenham*, recommends opiates, in those cases of want of sleep, restlessness and delirium, which occur in the decline of fevers: for he excludes them, before the twelfth day of the disease; but adds, if they are omitted until the fourteenth; their effects will be more certain and advantageous. The tendency of the precautions he lays down with respect to their use, appears to be, that the inflammatory state which occurred in the beginning of the epidemic, which he refers to, should have been carried off by bleeding and other evacuations, previous to their exhibition.

The opiate he recommends is the *laudanum Lond. ad griss*; besides which there are some others to the like effect, which are composed of ingredients not, at present, in much use.

† *Dolæus*, following *Sydenham*, whom he quotes as his authority for the use of opium, in cases of febrile delirium, extols this medicine

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highly.

* De Febre continua Annorum, 1661, 62, 63, 64.
 † De Phrenitide et Delirio.

highly. He excludes it however in some situations where it will probably be found useful.

His mode of exhibiting it, was to dissolve five grains of opium in a ten ounce julep, of which three spoonfuls were given at a dose, and repeated at intervals, until the proper effect took place.

* *Boerhaave* and his commentator *Van Swieten*, appear also to have taken their ideas on this subject from *Sydenham*, and limit the exhibition of opium to the decline of fever. The latter however seems very willing to admit its utility, in cases of febrile delirium, whenever there shall be no longer any apprehension, of an inflammatory state of the brain.

He advises us, to begin with small doses, and to encrease them gradually, until the desired effects be produced.

¶ *Dr. Lind*, gives us accounts of the good effects of *opium*, in intermittent complaints, particularly in the hot fit, when it is attend-
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* Comment. in *Boerhaave Aphorismos*. § 702 & § 709.

¶ Appendix to the *Diseases of hot Climates*, P. 342.

ed with that severe head-ach, and restlessness, which threatened to bring on delirium.

He gave the *tinctura thebaica*, only in doses of from *gt. xv. to gt. xx.*

* Dr. Cullen, when speaking of *opium*, in his lectures on the *materia medica*, in the year 1761, says, that in cases of nervous fever, where the *vis vitæ* is apt to sink, opium may be used as a stimulus: that where remissions are distinct, it may be used in the same manner, as bark, and together with bark. *Wine* too, he observes, is an analogous remedy to opium. He farther adds, that he has seen fevers attended with very strong spasmodic affections, where camphor, musk, &c. were used, where opium was of much more consequence; and even that he has seen it remove delirium itself: and indeed he believes it may be said universally, that there is no case in which we use wine, where we may not also employ opium.

In his lectures on the practice of physic in the year 1769, he also adds, that *opium* is particularly useful, in every case of deli-

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rium

* Lectures on the Materia Medica.

rium that arises from irritation. He contends too, that there is a species of delirium, apt to occur in the course of continued fever, which wanting the characteristics of the phrenitic or inflammatory state, arises from irritation, and is only to be cured by large doses of opium.

* All these authorities, whilst they admit the efficacy of *opium* in certain cases of febrile delirium, object to it as hurtful, when this arises from an inflammatory state of the brain. But as in the fever which is the subject of our present animadversions, the symptoms which characterize debility, in opposition to inflammation, are strongly marked, even from the beginning; the state to which the objections are made, does not appear

* To these, might, perhaps, have been added Dr. *Jones*; but as one of the facts which he has adduced, and upon which great stress is laid, has been the subject of much contradiction, and dispute: and as his work appears to have been written under the influence of prejudice, and tending to exalt some persons and some opinions, at the expence of the reputation of others; I confess his observations did not carry that conviction, which they might have done, had he appeared to have been actuated by more liberal motives.

pear to have any existence here. On the contrary, that state of debility which was induced, in the latter end of *Sydenham's* epidemic, in consequence of evacuations, occurred in the early part of this. Farther, I believe it is now generally allowed, that diseases have not commonly the same inflammatory tendency; nor do they in general require, or bear, such large evacuations, as they did in his time.

If opium then was found adequate to the removal of so high a degree of morbid affection, as delirium; it seemed probable that the effects of this medicine would be more certainly efficacious in a lower degree of the same complaint, and in the earlier periods of this disease, provided some inflammatory appearances did not forbid its exhibition. And it is in these more early stages, that I have seen it particularly advantageous: so that I now lay it down as a maxim, that whenever pains in the limbs, or back, head ach, and the like, occasion restless nights, that opium may be administered to obviate these symptoms, with the best consequences: and although a total annihilation of the disease,
may

may not immediately follow, we shall, by the assistance of this medicine, be able in general, to prevent delirium from coming on ; and by ensuring a more mild form of the disorder, have a much better chance, of conducting the patient in safety through it.

I have been informed from authority on which I repose the greatest confidence, that the exhibition of opium in larger doses in the more advanced periods, and more dangerous states of the disease, has also been attended with happy effects ; * but having myself had no opportunities of seeing it successfully given, under such circumstances, I shall decline speaking upon that point. But if it be capable of being thus useful, in the later stages of the disorder, it will certainly stand a much better chance of success, if given before the strength is much exhausted, or the symptoms indicating extreme danger, have made their appearance.

We now come to speak of the dose ; and the manner of exhibiting this medicine.

Opium

* To the amount of 120 drops of *Tinctura Thebaica*, at a dose.

Opium requires the same precautions, in its use, that all medicines possessing particularly active qualities, do: for whilst given in too small quantity, the desired effects are not produced; so in an over dose, it may be converted into a poison. I do not know that the smallest quantity capable of inducing death, has been ascertained by experiment; or the largest that may be taken with impunity: much will depend upon original idiosyncrasy or peculiarity of constitution, which cannot always be known *a priori*; and upon the degree and nature of the morbid affection, at the period the opium is administered.

It seems to be generally allowed that there is a considerable analogy, betwixt the effects of opium, and of spirituous liquors or wine: and that constitutions, are perceived as different with respect to their powers of bearing large doses of the one, as of the other. Thus almost every person may recollect some of his acquaintance, who can carry of two bottles of wine, with less inconvenience, than another can a pint of the same liquor; and I have known a person capable of drinking

a bottle of coniac brandy, glass for glass, in the same manner and in as little time, as another would a bottle of port wine; and with no greater apparent effects. Similar differences must have been observed by every practitioner, on the first exhibition of opiates. I have said on the *first exhibition*, because it is well known, that if we begin with small doses, these may be gradually encreased in such a manner, as to become habitual; and be taken with advantage, or at least impunity, in quantities, that would have been in the highest degree dangerous, in the beginning of such a course.

In certain states of morbid affection, the system is insensible to such doses of medicines, as would have been very powerful in the usual state of health; or in disorders of a different nature: and thus it becomes necessary to augment them, in order to produce the desired effects. But as the morbid affection abates, the usual sensibility to impressions will return. This is particularly the case with respect to opium, which should therefore, be always given with caution; and a due attention to the degree of disease present,
and

and to its encrease or abatement.

In the case of the lady I alluded to formerly, who was capable of taking four bottles of wine in twenty-four hours with advantage, (the relief which was obtained from it, being clear and immediate, in obviating faintness and sickness;) this was in consequence of the extreme debility, with which she was then affected: for as she began to recover, the calls were proportionably less frequent, and smaller quantities were adequate to produce the same effects; and ultimately when restored to health, as many glasses, as she had taken bottles during her illness, could not be borne without inconvenience. It must here be likewise obvious, that the same quantity of wine could not have been given in the decline of the disorder, as was exhibited in the more dangerous periods, without evident bad consequences.

So with respect to *opium*, we know that in maniacal cases, those of locked jaw, or *tetanus*, mortifications, and similar complaints; it may be given with safety and advantage in such doses as could not be taken by a person in health, without considerable

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inconvenience, if not danger.

But even in states of disease where opium is manifestly proper, an over dose may be attended with the same bad consequences, as in other situations. I have an unfortunate case in my eye, where an attempt was made to cure a violent convulsive disorder by means of opium. The patient was a robust man, who was affected with severe and frequent twitchings. One day, he took two grains of solid opium, which was repeated at the interval of two hours, and again at the end of other two hours without any sensible effects. Six grains having produced no alteration in his symptoms, when taken in this way, he took three grains the day following, at a dose, and three grains more at the distance of an hour, without any perceptible consequences. The succeeding day, the spasms being more violent than ever, he took thirteen grains of the same medicine in the course of five hours, without the least effect on his convulsions: nor did this quantity produce either sleep, delirium, or thirst. He was then ordered to take sixty drops of liquid laudanum, which was repeated four times

times, at the interval of an hour betwixt each dose. This had no sensible effect in diminishing the spasms, or affecting him in any other manner. The next day the dose was augmented to eighty drops, and repeated four times at the same intervals. He slept about an hour after taking the four doses of laudanum, and then awaked seemingly in his usual state of health, the opium having had no effect on his convulsions; he went to bed about ten o'clock; at twelve the nurse observed that he was in a very profound sleep, but did not attempt to awaken him: at six in the morning she found him still in the same state, as before, and on endeavouring to rouse him, found it impossible. Every method was used for that purpose, that could be thought of, but in vain: he died about eight o'clock that morning. On dissection an *ecchymosis* was found in his stomach: no other morbid appearance in the alimentary canal; nor in the brain. Here thirteen grains of opium were given in the course of a few hours, without any bad consequences: at another time 240 drops of laudanum, which are equal to about nine

grains and an half of opium, also, without any sensible effects ; but when on the succeeding day, the dose was encreased to 320 drops of laudanum, which is equal to thirteen grains of opium, (a quantity that he had taken before, in a solid form, with impunity), fatal consequences seemed to follow the exhibition of the medicine. It must not however be suppressed, that a pint bottle was found in his bed, which contained some whisky, and of which it was supposed that he had drank.

* *Dolæus* gives us an instance where a scruple of opium, dissolved in a clyster, which was exhibited in a complaint in the bowels, brought on apoplectic symptoms, and finally death.

In the case of a poor woman in this neighbourhood in a consumption, a few years ago, for whom two drams of *tinctura thebaica*, were ordered, of which she was directed to take a few drops every night, to allay the tickling of her cough ; the whole having been given by mistake, comatose symptoms ensued

* Encyclopædia, P. 322.

fied, which terminated fatally within twenty-four hours.

Many other instances might, if necessary, be adduced to shew, that whilst there are some constitutions endued with considerable powers of resisting the usual effects of wine, spirituous liquors, and opium: or in other words, of bearing large doses of them without any bad consequences: that there are others as remarkably susceptible of their impressions. And whilst some morbid affections enable the constitution to bear larger quantities of opium, than it could do in health; the repetition and augmentation of the doses are to be proceeded in, with proper caution, as even here, what amounts to an over dose, may be productive of the same bad consequences, as in other cases.

With these considerations in my mind, I began to exhibit this medicine. As it is when joined to camphor, so efficacious in producing a determination to the skin; and as this last medicine has been looked upon as an useful one in these fevers, I first gave it in the following *formula*.

R. Opii pur. gr. i. ad griss.

Camphor.

Camphor. gr. x. ad gr. xv. f Bol.
Hora decubitus sumendus.

In this dose, when the symptoms were mild, or in the early stages of the disorder, it was attended with all the expected good effects; but when the disease had been sometime formed, and the symptoms more violent, it was not adequate to the purpose: I then augmented the quantity, and the *formula* which I now generally use is as follows.

R. Tinctur. Thebaic. gt. lx.

Zulep. e Camphora unc. iss. M. and sometimes with the addition of thirty or forty drops of *antimonial wine*, when the tongue is particularly dry and hard, or the thirst considerable.

Of this the patient took two-thirds in the evening, and the remainder at the end of two hours, if sleep or at least rest did not ensue. There was in the *acme* of the disorder, generally a necessity for the whole quantity, but seldom any occasion for more. I have however in some, though few instances, found it necessary to give twenty or thirty drops more of *tinctura thebaica*, at the end of other two hours. For it must be
 observed;

served, that unless the sedative effects of the opium, be produced, that I never saw any good effects from this medicine. By this I mean, that it should be given in a quantity, sufficient to induce sleep or at least rest, ease and quietness, in opposition to restlessness and watchfulness: and until the patient ceases to be sensible of the head-ach, and pains in the limbs or other parts of the body; which is generally effected by the above dose. With respect to any farther quantity it must be left to the discretion of the practitioner, and result from the necessity of the case. From the return of head-ach and tendency to delirium, I have sometimes been obliged to repeat the doses in the morning: but in general the truce obtained by the opiate given in the evening, made the succeeding day pass on tolerably easily, and the patient took the cordial mixture (P. 73) and food better; which last I always found to be a favourable symptom, as much as a total aversion to aliment, was a bad one.

It however happened not unfrequently, when the complaint spun out to a considerable length, that the patients obstinately refused

fused the mixture and all other medicines, except the opiate at night, which with the cordial regimen consisting of broth, and gruels with wine, were the only things taken during the greatest part of the illness : and these I have often seen adequate to the removal of the symptoms of the disease ; and to the recovery of health.

It is almost needless to say that the dose of the *laudanum*, or *tinctura thebaica*, was in the cases of children diminished ; and proportioned to their respective ages. In general I gave about 20 or 25 drops, to those that were from twelve to fourteen years of age.

As the force of the disease abated, smaller quantities were adequate to the inducing sleep or rest, with the other desired effects : 30 or 40 drops of the *tinctura thebaica*, were generally sufficient in the cases of adults. Where any considerable stupor appeared on the succeeding day ; it was proper to omit the opiate on the following night, and until this stupor and heaviness had gone off : and where the nights were passed easily, and the patient rested well, the circumstances which
render

tender the use of opium proper or necessary; did not seem to exist.

Nothing could be more striking, than the contrast which might be perceived in a morning, betwixt two patients in similar situations, one of which had taken the opiate the preceding night, and the other had not. The same observation might also be made upon a patient, who by any accident had omitted the opiate in the evening, after having taken it a few preceding nights. In the one case, you would hear that the night had been passed quietly and easily, and find the patient in the morning refreshed by the rest, he had obtained, and with few complaints: in the other, that he had been restless, disturbed and uneasy, with a continuance or aggravation of all the disagreeable symptoms.

The effects of the opiates were sometimes a remarkable cessation of the febrile symptoms; though in general no considerable alteration in the pulse was occasioned by them; but rather a mitigation of those more violent affections, which threatened to bring on delirium, or to exhaust the patient by pain,

sickness or watching ; and they seemed, as I have before observed, to keep the disorder within bounds, and induce it to go through its stages in a more mild, and less dangerous manner.

Having had no opportunities of seeing the effect of fixed air, administered in the form of *Bewley's julep* : * or of the *spiritus vitrioli dulcis* in the manner recommended by Dr. *Carmichael Smyth*, I am not qualified to speak of these preparations. I cannot however but think them well worthy of notice ; the one appears calculated to allay thirst, and obviate putrescency, which often occurs in the *primæ viæ* ; and the other has been found useful in abating the frequency of the pulse, and inducing *apyrexia*. †

We come now to speak of the treatment of what may be called *anomalous symptoms*, which were apt to occur in the course of the complaint, such as *sickness* and *vomiting* ; *diarrhæa* ; *convulsive twitchings* ; *hiccup* and *pains* in various parts of the *chest*.

The

* *London Medical Journal*, vol. 2. P. 140.

† *London Medical Communications*.

The *sickness* and *diarrhœa* have been already noticed.

The *twitchings* of the arms, and whole body, did not appear to be those small motions, which attend the last stage of these fevers, and are called *subfultus tendinum*: they occurred earlier in the complaint than these, and were accompanied with a considerable degree of strength, and a more forcible exertion of the muscles. I do not by this mean to assert, that *subfultus tendinum*, did not frequently happen in the last stages of this fever; but merely to point out a state of convulsive motions, which often occurred, especially when the head was much affected, that was distinct from that case.

To obviate these convulsions, I gave ten grains of musk, and five grains of camphor, every six hours, and they generally disappeared in the course of a few days. The *biccup*, might probably be referred to the same head as the other convulsive motions, and gave way to the same remedy, musk: but the giving ^{of} that medicine in sufficiently large doses, not agreeing with the pockets of the poor, a very respectable practitio-

ner * informs me, that he has found two teaſpoonfuls of a mixture of *tinctura fœtida* and *ſpiritus volatilis aromaticus*, given every hour or two, moſtly carried it off.

A pain often attacked the ſide, or breaſt, with ſharp ſtitches, which affected reſpiration. A bliſter applied immediately over the pained part, appeared to be the remedy appropriated, for the relief of theſe ſymptoms.

Hemorrhages from the noſe, were moſt effectually checked, by doſſils of lint, moiſtened in vinegar, and then rolled in powdered alum, thruſt up the noſtrils.

If I were then to recapitulate in a few words, what I would recommend as the moſt eligible mode of treating this fever, it would be as follows.

As ſoon as the ſymptoms of the firſt attack are perceived, let an emetic be given, (ten grains of *ipecacuanha*, and one or two grains of *tartar emetic*†:) let this be followed
by

* Mr. Fell of Ulverſtone.

† A very ingenious gentleman (Dr. Thornton) who did me the favour, of looking over my manuſcript, obſerved

by a *bolus* composed of ten grains of camphor, and a grain or a grain and an half of opium; or thirty or forty drops of laudanum, in an ounce of camphorated julep, at bed time. These will have a tendency to encourage a diaphoresis, especially if aided by some warm wine whey, with or without a teaspoonful of spirit of hartshorn, *spiritus volatilis aromaticus* or the like, as appears proper and agreeable. By these means such

ved, that as the disease is ushered in with symptoms of debility, and as puking may arise from this state; and is oftener the effect of a weak than a foul stomach: that there is here an ambiguity with respect to the propriety of augmenting this sickness by the exhibition of emetics. And farther, that it is easy for the best observer to be deceived with respect to their effects, when immediately afterwards stimulant medicines and cordials are given. If Sir *John Pringle* gave stimulants in the manner usually recommended, after the operation of the emetic, what he attributed to the puke, this gentleman should be persuaded, was the consequence of the other medicines.

These observations appear to me well worthy consideration. Practice has authorized, and almost sanctified, the use of emetics, at least in the early stages of the disease: but it is from a fair comparison of cases where they have been exhibited, and where they have been omitted, that we can only form a true estimate of their proper application.

a remission of the symptoms, are frequently induced in the morning, as to allow of throwing in the *cortex*, of which at least an ounce should be taken in the course of the day, joined with broth, gruels, nourishing diet, and wine, in such quantities, as the stomach and head will bear, without inconvenience. If by these means the symptoms of fever are kept under; this course, both with respect to medicine and diet, should be continued for several days, to fortify the habit, against a recurrence of the disease.*

Should the above practice not have had the desired effect; or application not have been made until the fever has been more formed, and the thirst, lassitude, restlessness, and head-ach are more urgent; I would give the opiate at night as directed (P. 94): and rub the forehead, if the patient complained much of pain there, with the embrocation (P. 71): and as the stomach will now be apt to loath the *cortex* in substance, from large doses of which the same good effects do not seem to ensue, as formerly, I would give through the day, the cordial mixture (P. 73) joined to

* With the omission of the emetic, after the first exhibition.

to broth, wine in gruels, or any other form, in such quantities, as seemed indicated, by the degree of faintness and lowness. If the confusion and pain in the head, appeared to be considerable, it should be shaved and rubbed all over with the embrocation (P. 71); and this particularly, if the subject be an adult male, in whom we have seen that the danger is proportionably so much greater, than in females or children: and if in the course of the next day, there appears to be a tendency to delirium, a blister should be applied over the whole upper part of the head, continuing the same course with respect to medicine and diet as has been recommended before. Finally, if symptoms of delirium, continue to threaten, or have actually come on, blisters may be applied to the nape of the neck, and behind the ears; and the pediluvium, or warm fomentations to the feet, and lower extremities: still giving the opiate at night, and repeating it in the morning when necessary; together with the same tonic cordial medicines, and diet, during the remainder of the disorder. If any looseness occurs it is to be checked by the addition of a sufficient quantity of the *confectio japonica*, or some
 medicine

medicine of a like tendency. Sickness and vomiting are to be obviated by saline medicines in the act of effervescence; convulsions and spasms by musk and camphor; and pains or stitches in the side or breast, by blisters near the parts affected.

This mode of treatment, I can recommend from having in a great variety of instances, found it successful. The cases that have terminated fatally have been generally those, where application was made late; or the directions that had been given, not properly complied with.

After having taken notice of the tendency which confined air and filth have to produce this complaint, it is almost needless to insist upon the necessity, of properly ventilating the apartments of the sick; of the practice of cleanliness with respect to their persons and cloathing; and of removing every thing dirty and offensive from their rooms: indeed without proper attention to these circumstances, and a sufficiently nutritious diet, the aid of medicine will be invoked, with little prospect of advantage.

C H A P. V.

Conjectures, on the Proximate Cause of the disease; and the operation of medicines.

PHYSICIANS have generally divided the causes of diseases, into two heads; viz. the *remote* or *exciting*; and the *proximate*, on which the existence of the disease depends. The former has been already sufficiently noticed, in the first parts of this treatise; and the proximate cause should in point of order, have preceded the method of cure, because this being once ascertained, the other would have followed as a natural consequence. But when I considered how much men of the greatest learning and abilities had been mistaken in their ideas of the proximate causes of diseases; and that most of the systems advanced, have instead of guiding us to true knowledge, only tended to shew with how much ingenuity error might be maintained; I thought it safer to leave those methods of treatment, which had

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been ascertained to be eligible, upon their own solid basis : and if we could afterwards assign rational causes for symptoms, and for the operation of remedies, that this should be done, without warping a practice which having been found successful upon experiment, ought not to be bent to accommodate an hypothesis. It has indeed but too often happened, that men of the greatest eminence in the profession, have formed theories of diseases in their closets, at an early period of their lives, from not sufficiently extended views of the phænomena of nature, to which their subsequent practice has been adapted : and those remedies, whose operations did not suit the principles they had espoused, have been rejected, however useful they might have been found upon a fair trial ; or that they have been either before or since experienced, in the hands of others : whilst, on the contrary, medicines of the most inert or dangerous qualities, have been brought forward with the zeal of new discoverers ; recommended with the confidence of prejudice ; and persisted in, with the obstinacy of error.

This has certainly contributed much to retard

tard the progress of our art; and has prevented it from attaining that degree of perfection which it would probably have done, had its professors, employed themselves, in observing the actual effects of medicines, and the occurrences of the animal œconomy, instead of forming visionary theories : which being merely the offspring of fertile imaginations, without the solid foundation which facts and experiments afford, have been demolished by their cotemporaries, or successors; who had only to point out the flagrant absurdities, with which they abounded, to expel them from the situation in which they had been so improperly placed ; and who perhaps, (strange to tell,) have substituted others, as visionary and fleeting, in their stead. What cause then, has any person, who reasons of the future from the past ; and who to day may sport this or that proximate cause of disease, in preference to another, to hope that his, shall not also find its *hic jacet*, in the course of a few weeks or months ; and escape being interred in the common sepulchre of its predecessors ? It is truly mortifying to professional vanity, to recollect, how

few of those medicines, that are the most useful and approved, we owe to the sagacity of the learned, and the inductions of studious speculation: and how many to accidental discoveries, and to the practice of illiterate persons, and even of savage and barbarous nations.

The implicit obedience, and servile deference, that was for so many ages paid to the opinions of *Aristotle*, and other antient writers, has been justly supposed to be the cause which confined our stock of experimental knowledge, during those periods, to so small a compass: and as the evil extended to every branch of science, physic amongst the rest experienced its torpid influence. But as we now live in an age, in which our inclination to obtain a knowledge of facts, and the phenomena of nature, which we make the ground work of our reasoning, is too strong to be influenced by any blind attachment to mere opinions; which we have seen may be entertained, as erroneously by the wisest and most enlightened, as by the dullest and most unlearned: and as we do not reject the conclusions which may be fairly deduced, from any new discoveries, in whatever quarter their
light

light may dispel the darkness of ignorance, or of error, we perhaps stand a chance, of coming nearer the truth in our conjectures, than formerly. But how wide the gulph may be, which yet lies betwixt us, and the object of our pursuit, who can ascertain ?

The inclination to assign rational causes for the effects which pass under our observation, is however so congenial to our nature, that the medical man may surely assume a liberty, and indulge himself in an excursion, into the land of conjecture, in common with his fellow cultivators of science. And if in exploring that region, where the most sagacious have been bewildered; instead of wandering at random, and yielding to the impulses of a delusive imagination, we keep in our hands the clue of experimental knowledge, and are guided by the star of calm reason, over the solid ground which facts afford ; who knows but some portions of this *terra incognita* may be accurately explored, and some landmarks be ascertained, which may conduct us to the objects of our pursuit ?

Since the study of anatomy has been so successfully cultivated, and the distinctions
betwixt

betwixt natural and morbid appearances accurately defined; expectations have been reasonably formed, that the dissection of dead bodies, would tend to throw considerable light upon the causes and seats of diseases: and consequently be of benefit to future sufferers, in similar cases.

With respect to *chronic complaints*, the result of the enquiries, has generally been the discovery of, some material disease of a *viscus*, whose functions were essential to health and life; and whose altered organization, whilst it assigned an adequate cause for the fatal event that had taken place; afforded the melancholy satisfaction, that although it was out of the reach of the medicines that had been employed, it would be difficult to say what other course, could have been instituted, with better prospects of success. The discovery too, that certain symptoms proceed from incurable diseases of the *viscera* may, as the late ingenious Dr. *Hunter* has observed * lead to practices important to humanity; by inducing us to reject those

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* Medical observations, vol. 6.

rough medicines, or operations, which can only teize and torment a miserable human being; and incline us rather to attempt to palliate, what we cannot radically remedy: and thus add comfort and ease to that portion of life, through which the patient has yet to pass.

The dissections of chronic cases, may also have another good effect; for the symptoms of internal affections, are sometimes so obscure, as to give rise to mistakes, as to the seat of disorders, which these may tend to elucidate, and identify.

The dissections of persons who have died of *acute* diseases, may be productive of more evident advantages; for by ascertaining what particular *viscus* is affected, when certain symptoms occur, we may also frequently discover, not only where the seat of the disease has been, but also in what the morbid deviation consists: which having been effected in a short period of time, we shall in similar cases, in future, stand a much better chance of successful practice, by the early application of remedies, at once efficacious and rational.

It must not however be inferred, that we can upon the anatomical inspection of a dead body, always discover a cause, adequate to the event produced ; since it is a confession, that has been made by those, upon whose accuracy and fidelity we can best depend, that the cause of death has frequently escaped their most diligent enquiries, when inspecting the bodies of such as have died of acute diseases : † a confession which others have also been under the necessity of making. This however is not always the case ; and we are furnished with many instances, with respect to the disease, which is the subject of this treatise, where upon dissection, injuries of the *viscera*, but especially the *brain*, have been found, which were as adequate to produce death ; as a mortification of the intestines in the case of a fatal *ileus* ; or the liver-like appearances, and sanious effusions, into the cellular substance of the lungs, in pulmonic diseases.

The danger of this disorder is in general to be estimated in a *ratio* compounded of
the

† Morgagni de sedibus et causis morborum, lib. XL.

the morbid affection of the brain, and the general debility; but mostly with respect to the former, as if the disorder be not accompanied by delirium, the method of cure, is as obvious in theory, as it is easy in application. A dangerous determination to; and affection of other *viscera*, especially the lungs may also occur, in the course of the disease which will have a similar influence on our conclusions, and prognostics, as when the disorder principally affects the brain.

On dissection of such as have died of this fever the brain, frequently, I may almost say, constantly, shews evident marks of local affection, and injured organization; of increased determination of fluids; of distended and ruptured vessels; of effusions and suppurations*: to which the symptoms of headache, flushed cheeks, red *adnata*, and delirium correspond.

I have to lament, whilst custom, did not authorize, the anatomical inspection of the bodies of such as died here, of this disease; that prejudice was so strong, against introducing

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* *Pringle's Observations on the Diseases of the Army.*

ducing a practice, from which useful information might have been derived. However, as there is no doubt of this disease being of the same nature, with that, in which the appearances that occurred upon dissection, are recorded by Sir *John Pringle* and Dr. *Lind*; the general conclusions from these, may be reasonably transferred to other cases, which have been affected in a similar manner.

In accounting for the symptoms of this fever, I would then say, that the remote causes, formerly enumerated as giving rise to this disease; or the contagious effluvia; in their operation on the human body, induce a state of debility in the system; which is evinced by the prostration of strength, loss of appetite, weakness of pulse, and other symptoms, which occur evidently in the beginning; and increase in proportion to the duration, and violence of the disease: and it would seem that whilst this debilitating power influences the whole system, that the vessels of the brain are, from the peculiar laxity of their fibres, apt to be affected with a greater proportional
loss

loss of tone, than happens in other parts of the body ; and hence become distended with an unusual quantity of fluids, which from their increased bulk, and subsequent effusions, and suppurations, occasion head ach, irritation, delirium and death. As there do not appear to be any marks of inflammatory *diathesis*, in the course of the complaint, these occurrences in the brain, cannot be supposed to arise from that cause ; and may equally be accounted for on our supposition. We know too, that in the plague, a disorder where the symptoms which indicate debility and a sinking of the *vis vitæ*, are very striking ; that the heart and larger vessels, are apt to lose their tone so far, as to be considerably enlarged, and even burst in consequence. *

The same circumstances, that so frequently take place in the brain, in this fever, appear also to occur, at times, in other *viscera* : and hence, the symptoms of pulmonic affection † ; the effusions of coagulable lymph, which

P 2

Dr.

* *Chenot de la peste.*

† P. 64 of this treatise.

Dr. Lind found an the surface of the *pleura* and in the *pericardium* || : and the affections of the intestines mentioned by Sir *John Pringle* §.

Whilst the vessels of the brain are of a laxer texture, than those in other parts of the body ; and the fibres of males are more robust, in general, than those of females ; and of adults than of children : is there with respect to these last, less disproportion betwixt the relative strength, rigidity, or force of cohesion of the vessels of the system in general, and those in the head, than in adults, and especially males ? If this be so, can we account for the general escape of young subjects, whilst the disorder proved so much more fatal, to grown up persons ; by saying, that in consequence of this more equal state of the fibres, the debilitating power would also operate in their systems, more equally than in the case of adults : and of course, the organization of the brain would not be so apt to be injured with them, as when the comparatively greater loss of tone in the
vessels

|| On fevers, P. 95, 96.

§ Observations on the diseases of the army, P. 303.

vessels within the *cranium*, than in other parts, naturally occasioned, a proportionably greater accumulation of fluids there ?

If then the disease consists in debility and a loss of tone, in the whole system, but especially in the vessels within the *cranium*, which by their increased bulk and effusions, irritate and disorder the *sensorium* ; and finally by compression, and the destruction of the organization of the brain, induce death ; we can see why the bark and that nutritious and strengthening course, formerly recommended, are found useful : also why opium, blisters and the pediluvium, which obviate the effects of these causes, prove serviceable : and on the other hand, we can readily discover why purging and evacuations, encrease the danger : and why emetics which determine more blood to the head, as well as fatigue the patient, are so hurtful in the more advanced stages of the disease.

Inflammations, and congestions both of red blood, of *serum*, and of purulent matter, may occur in many parts of the body, without considerable inconvenience ; but this can only be in portions endued with little sensibility,

bility, or whose functions are not essential to life : as they can never happen in those circumstances otherwise, but they must be attended with pain or danger. This is particularly the case, with respect to those which take place in the brain ; where they either occasion acute pain, or produce stupor, or delirium. This first is generally the forerunner, and indicates a less degree of morbid affection than the latter.

Now, although pain may be only a consequence of distention of the vessels, and of fluids accumulated; and therefore to render the patient insensible to it for a few hours, may be said to be merely palliative, and not tending to remove, what we have laid down as the cause of the disease : yet as the effects of this sensation so long continued, happen in a system composed of irritable fibres, where the disorder of one *viscus* extends in a greater or less degree to the whole ; if that rest and sleep, by which the constitution is refreshed, and enabled to support itself under any fatigue, be totally taken away ; so great a degree of languor and debility will be superinduced, in consequence of suffering un-

remitted

remitted pain and watching, as must encrease the force of those causes which gave rise to the symptoms, that constitute the disease. So that although in procuring temporary rest and sleep, by means of opium, we may only obviate a symptom; yet if we can by this means interrupt the disease in its course, and prevent its making so great a progress, as it would have done but for this check, it may fairly be reckoned as so much gained. The opium appears in its operation to procure a cessation of pain and watchfulness; and to induce sleep, or at least a state of rest; and by this means, gains a truce for the constitution, to rally her hard-pushed powers, and make a better resistance afterwards.

I dont know but the effects of opium, in relieving this state of watchfulness, head ach and delirium, may be illustrated, by what I have observed in the case of *ophthalmia*. Every one knows how obstinate this disorder sometimes is. I have seen general bleeding repeated; cathartics given; blisters, leeches, *collyria* of various kinds, applied, without the desired effects: and at length after a considerable space of time, the inflammatory appearances go gradually off; and

and amongst the variety of applications, perhaps a very inert one, made use of, when the disorder was giving way, has gained praises, to which it was ill entitled, as its failure in subsequent cases, has evinced. In the course of some of these cases, the pain has been so violent, as to prevent sleep in the nights; and in order to procure a little ease, an opiate has been given at bed-time; which has been generally attended with so much advantage to the patient's feelings, that it has been repeated, and continued until the eye has taken a decided turn for the better. Now in looking back to some of these cases, I have observed that we might date the abatement of the complaint, from the time the opiate began to be exhibited; which although little attention was paid to, at the time, otherwise than as a mere palliative, had I believe the greatest share in effecting the cure. For although the pain, in the first instance, might only be an effect of the accumulation of blood, and the distention of the vessels and nerves, yet it afterwards seemed to act as a cause, in rendering the disorder tedious and obstinate; and finally when the sensation of this *stimulus*, was taken off for

a few hours daily, the vessels seemed to recover their proper tone, and the appearances of inflammation disappeared.

The same effects from opium, are observed with respect to *catarrhus affectiones* and *coughs*, where there is an expectoration of a thin acrid matter; the irritation which this occasions, prevents the rest, necessary, for its acquiring a properly concocted state. Stop the unavailing, unprofitable irritation of this cough, a few hours, by means of an opiate, and a kindly expectoration often succeeds, with relief of all the symptoms.

Thirst, when to a great degree, is with respect to its effects on the system, to be put upon the same footing with pain: this troublesome sensation, will also receive a temporary suspension, from the opiate.

Although I have mentioned the case of head-ach and delirium, as occurring in consequence of a larger quantity of fluids than usual, being accumulated in the brain; and which conclusion we are, I think, warranted to draw, from appearances both during the disease, and on dissection; I would yet, by no means be understood to assert, that they may

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not

not also happen, in this, as well as in other disorders, where there is no reason to suspect such circumstances. *Delirium* we know may originate from pain and other affections in distant parts of the body; in which case the brain becomes disordered, from that general law of the system, by which the deviation from health, of any particular portion, is more or less communicated to every other. In some cases this may be, by a general inflammatory *diathesis* which extended thither, gives the appearance of phrenitic delirium: at other times delirium may occur with a pale face, and a natural and weak pulse, and a sunk eye, without any redness or suffusion of the *adnata*. This last kind generally arises from an unusual irritation of the nervous system, whether in consequence of pain, or any other cause; and the operation of opium, in the removal of it, whilst it seems generally advised as the proper remedy, is, from the admitted effects of that medicine, sufficiently obvious. Our creator in furnishing us with nerves, which are the organs of all our sensations, and consequently of pain, has kindly endowed the animal frame, with qualities,
which

which confine the perception of it, to a certain degree: for whenever it goes beyond a particular point, such impressions are communicated to the brain, as induce that state which we call *delirium*; when the sufferings of the person, as a rational being, either cease to exist, or are at least suspended. By this means the pains we may suffer in diseases, or accidents, to which we are obnoxious; as well as those, which the ingenious cruelty of man, would sometimes wish to inflict on his miserable fellow creatures, are in some respects limited: since however the body may appear, in either case, to be agitated, yet after the delirium is come on, the mind is no longer susceptible of what passes; and the impressions are made upon a mere machine.

I have hitherto, avoided speaking of the dissolved state of the blood, and of the putrefaction of the fluids, which have generally formed so large a portion of the proximate cause, of these fevers. I have done this, because, whilst I think with Dr. *Milman*, that there is not sufficient evidence to found the doctrine on; and that many circumstances militate against the justness of the idea: it

seems to be of the less consequence, because, the same medicines that obviate debility, are in general resistors of putrefaction: and I think no one would reject such articles, as have been found highly beneficial upon trial, for others, which might be supposed more proper, merely from their possessing stronger antiseptic properties, upon substances out of the body.

In addition, to what this very learned gentleman, has advanced, upon the subject of the state of the blood, in putrid fevers; I would observe, from the testimony of Dr. *Lind*, that he frequently found the coagulable lymph, in a most tenacious state, in the bodies of such persons, as had died of these fevers; and that the blood, which had been taken from a patient labouring under an infectious fever, so far from being in a dissolved, much less in a putrescent state, was found to resolve into its usual component parts; and was covered with a yellow, thick, tough *gluten*, impenetrable to the finger*.

In those hemorrhages from the nose,
which

* On fevers P. 96.

which have come under my observation, (as I never saw any blood taken from the arm, in this fever,) the appearances were not different from what are commonly observed, on these occasions; neither in colour, or texture when cold (for I once caught some of the blood in a teacup); nor upon the linen where it had flowed.

But although the putrefaction, or even dissolved state of the circulating blood, in this disease, be at least problematical; there is no doubt but extremely offensive smells, are frequently observed, during the course of the complaint, which indicate a tendency to, if not the actual presence of putrefaction. But this, I apprehend, may be easily explained, without inconsistency; because, from the debilitated state of the solids, and a diminished force of cohesion in the fibres, the confined fluids, will have a tendency to ooze from the mouths of the relaxed exhalants; or to escape from the ruptured sides of the vessels, and occasion *hemorrhages* from the nose, gums, *uterus*, and other parts; or form *petechiæ*, in various portions of the cellular membrane. Now it is well known, that there

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is no animal substance, more apt to become putrid, when retained in the heat of the human body, than extravasated blood: so that when these effusions take place, they will generate offensive smells, and promote a tendency to putrefaction, in proportion to their extent and duration. I have mentioned them as occurring in the mouth and communicating excessive *fetor* to the breath: the same may happen in the whole course of the alimentary canal, and give an uncommon taint to the stools; and hence the exhibition of fixed air in effervescent saline draughts, or in *Bewley's julep*, may be a rational, as well as efficacious remedy, when these symptoms appear.

Much has been attempted to be deduced in support of pre-existing putridity, from the proneness of the bodies, of such as have died of this disease, to putrefaction. That this will often happen I have no doubt, especially, where *petechiæ* abound, or other hemorrhages have occurred: but I believe no bodies, will be more prone to become speedily offensive, than those, of such as have died of highly inflammatory complaints.

After

After all, there seems to be something in the effect of contagion, and the other causes which produce this fever, superadded to that debility, which so evidently occurs, and the obviating of which, is, at present, the great object of our practice: because if it acted merely by producing a certain degree of debility, in the system, it would naturally follow, that whenever debility was induced to that particular degree, by any means; that the disease in question, in one state or other, should ensue. This however, we know is not the case; and besides upon this principle, recovery would be impossible, as no degree of debility could be more extreme, than that which was sometimes seen, when the fever left the patient; and yet nothing, that could be denominated disease, then existed. It is probable, (and the conjecture is at least harmless,) that the volatile something which issues from the diseased bodies, or infected cloaths, and whatever else gives rise to this fever, is absorbed into the system; where it continues to act upon the irritable and muscular fibres, by destroying their tone, and perhaps circulates with the fluids, during the course of
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the disease: but is of too subtile a nature to be the object of our senses, much less, at present, of our practice, otherwise than in tracing or obviating its effects.

F I N I S.

E R R A T A.

P. 12, line 16, for *emminence* read *eminence* —P. 31,
line 2d from bottom, for *general*, read *generally*.—P. 33,
line 1, for *do*, read *does*.—P. 51, line 15, dele *may*. —P.
60, line 22, for *loosness*, read *looseness* —P. 64, line 9,
(in some copies,) for *similar*, read *smaller* —P. 69, line
6 of the note, for *probabably*, read *probably*.—P. 72, line
7, for *debilty*, read *debility*.—P. 97, line 7, for *preceeding*,
read *preceding*.