

A description of the jail distemper, as it appeared amongst the Spanish prisoners, at Winchester, in the year 1780; with an account of the means employed for curing that fever, and for destroying the contagion, which gave rise to it / by James Carmichael Smyth, M.D. F.R.S. fellow of the Royal College of Physicians, and physician extraordinary to His Majesty.

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Dr John Howell

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from the author

DESCRIPTION

LAKE DISTRICT

THE LAKE DISTRICT

WITH AN ACCOUNT OF THE MOUNTAINS EMITTED
FOR THE YEAR 1841

THE DISTRICT OF THE LAKE DISTRICT, WHICH
GAVE RISE TO IT.

JAMES CARROLL SMITH, M.D., F.R.S.
FELLOW OF THE ROYAL SOCIETY OF LONDON
AND OF THE ROYAL SOCIETY OF EDINBURGH
FELLOW OF THE ROYAL SOCIETY OF LONDON

LONDON

PRINTED BY J. JOHNSON, IN ST. PAUL'S CHURCH-YARD

1841

WILLIAM

347

DESCRIPTION

OF THE

JAIL DISTEMPER,

AS IT APPEARED AMONGST THE

SPANISH PRISONERS,

At WINCHESTER, in the Year 1780;

WITH AN ACCOUNT OF THE MEANS EMPLOYED
FOR CURING THAT FEVER,

AND

FOR DESTROYING THE CONTAGION, WHICH
GAVE RISE TO IT.

BY

JAMES CARMICHAEL SMYTH, M.D. F.R.S.

FELLOW OF THE ROYAL COLLEGE OF PHYSICIANS,

AND

PHYSICIAN EXTRAORDINARY TO HIS MAJESTY.

L O N D O N :

PRINTED FOR J. JOHNSON, IN ST. PAUL'S CHURCH
YARD.

M.DCC.XCV.



DESCRIPTION

OF THE

DEEDS & CATHEDRAL

IN THE CITY OF LONDON

WITH THE RIGHT HONOURABLE

STENRY DUNDA

CHANCELLOR OF THE EXCHEQUER

BY WILLIAM DUNDA

ESQ. OF THE INNER TEMPLE

AND OF THE BAR AT LONDON

AND OF THE BAR AT LONDON

AND OF THE BAR AT LONDON

AND OF THE BAR AT LONDON

AND OF THE BAR AT LONDON

DEDICATION.

TO THE RIGHT HONOURABLE

HENRY DUNDAS,

&c. &c. &c.

DEAR SIR,

WHATEVER reception the following pages may meet with from the public, they must allow the propriety of inscribing them to you; and that a work, which professes for its object the preservation of

the gallant defenders of our king and country, should be dedicated to the person who, upon all occasions, has stood forward as their friend and patron, and who at present possesses so great a share in the direction of the national force. I am ready however to acknowledge, that this dedication is not so much addressed to the minister, as to the man.

I am unacquainted with the language of panegyric, and have not the presumption to imagine, that any opinion of mine, respecting your talents and public character, can have any influence on the public mind. Neither is it my intention to say any thing of your qualities in private life; lest the voice of truth should fall under the suspicion of what I am as far from offering, as you from receiving. My only wish then
is,

DEDICATION.

v

is, that you would have the goodness to accept this tribute of gratitude, for the many instances of your partiality and kindness, and to believe that I always remain, with the most sincere sentiments of esteem and regard,

DEAR SIR,

Your much obliged, and

very faithful humble servant,

JAMES CARMICHAEL SMYTH.

London,
14th August, 1795.

CON-

DEDICATION

that you would have the goodness to
accept this token of gratitude for the
many instances of your partiality and kind-
ness, and to believe that I always remain,
with the most sincere sentiments of affection
and regard,

DEAR SIR,

Your much obliged, and

very faithful humble servant,

JAMES CARMICHAEL SMYTH

London,
14th August, 1790.

COM

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PREFACE.

THE Jail Distemper, which is the subject of the following pages, prevailed, during the spring and summer of the year 1780, amongst the Spanish prisoners confined in the King's House at Winchester; and, owing to the great mortality it occasioned, and the still greater alarm it excited in the neighbourhood, having become the subject of a parliamentary enquiry, the House of Commons appointed a committee to examine into the business. From their * report it appeared, that the disease in question had been brought by the Spaniards from on board their ships, that the commissioners of sick and wounded seamen, to whose

* Vide Appendix.

B

care

care every thing respecting prisoners of war is immediately committed, had been extremely attentive to their duty, and had employed every means in their power to check the progress of the contagion, though hitherto without effect. Towards the end of May, they, by the advice of the late Dr. Fothergill, applied to me, requesting in the most urgent manner that I would accompany one of the commissioners to Winchester, to undertake the cure of a disease whose violence and fatal effects were encreasing every day; and those gentlemen* will, I have no doubt, do me the justice to say, that however hazardous the undertaking appeared, I readily complied with their wishes, and as they left entirely to me the conditions of my attendance, I made none: convinced that

* Mr. Bell and Mr. Lulman, who were commissioners at the time, can witness this fact, as well as many others.

no pecuniary recompence could be an adequate compensation to me, circumstanced as I then was, for the risk I ran; and that if I was fortunate enough to survive and succeed, I was certain of the first of all rewards, the consciousness of having discharged a duty to which I was called by the voice of my country, and in the event of which the national character, as well as the cause of humanity, were so deeply concerned.

My success in this undertaking, I may truly say, was equal to my wishes, for in a fortnight's time I had the satisfaction to see the contagion almost compleatly destroyed, the number of sick greatly reduced, and those who remained in the hospital, for most part, in a state of convalescence*.

Upon my return to town I considered that a part, and an important one, of my

* Vid. the Hospital Returns, Appendix.

duty still remained unperformed, and that it was incumbent on me to give some account of the disease I had seen, and to point out those means that had been so successfully employed both in the treatment of the fever and likewise in destroying the contagion. But a series of bad health, the consequence of two very severe attacks of the disorder, prevented me for a time from executing my purpose, and the peace which followed in 1783 superceding, in great measure, the urgency of an immediate publication, I laid all thoughts of it aside, until I could introduce it as a part of a larger * work in which I had for several years employed my leisure hours.

Last summer, however, I was again led to revise my notes in consequence of an application from Dr. Morris, no less flat-

* An Enquiry into the Nature, Origin, and Distinctions of Epidemical Distempers.

tering to me than honorable to him. This gentleman (the son of Dr. Morris, physician to the army in America, and himself a physician to the army) having witnessed the destructive ravages of a contagious fever that broke out on board the Hessian transports at the Isle of Wight, and which afterwards spread amongst the troops stationed in that quarter, was desirous to be informed of the methods I pursued, in the treatment of the Winchester fever, and in destroying the pestilential contagion which occasioned it. In compliance then with his wishes I began to make some abstracts from my notes on this subject, but I soon perceived that the account would be much more compleat and satisfactory, and that it would be attended with very little more trouble to myself, if I executed my original plan. And although the doing it in this hurried manner, upon the spur, I may say, of the occasion, might cause some lit-

the inaccuracies in the stile or execution, yet as my chief object was general utility, if I succeeded in that, I flattered myself the public would readily excuse any trivial faults or omissions.

of

Of the Jail Distemper, &c.

IN every situation, where a number of people are crowded together, whether in ships, hospitals, or prisons, unless the strictest attention be paid to cleanliness, and to a free ventilation or circulation of air, a fever sooner or later breaks out amongst them, of a very contagious nature, and attended with very fatal effects; and which claims, in a particular manner, the public attention, not only on account of the mortality it occasions, but because this mortality so frequently occurs in our fleets and armies, amongst men who are gallantly exposing their lives in the service of their king and country, and at the very moment perhaps when their services and exertions

are more immediately required. This fever, at present known by the name of the Hospital Fever or Jail Distemper, has been already described by several physicians of eminence; but as the disease, though probably in every instance originating from the same cause, assumes, according to the violence or modification of the contagion, or from other circumstances not yet well understood, a variety of appearances, and has been treated in a very different manner by different physicians, we must acknowledge, that, until all those varieties are accurately pointed out, and the characteristic marks of the distemper distinguished from the accessory or accidental symptoms, its history is still incomplete.

With a view then of adding something to the general fund of medical knowledge, and of rendering more perfect the history of so important a disease, I have presumed to give a brief account of its appearance at Winchester; and this I am enabled to do

not only from what I saw, but from what I felt, having suffered two severe attacks of the fever myself, an experience which no one would willingly repeat.

Sydenham (justly considered as one of the first authorities in physic) has remarked of epidemical distempers, that they are in general more violent upon their first appearance and become milder from their continuance. This observation may be strictly true in certain epidemics, but was by no means so in the present instance, where not only the number of the sick, but the number also of those who perished by the distemper, encreased every day from its first appearance until my arrival at Winchester. But although the frequency of the disease and the mortality caused by it were not abated, I had reason to think, from the report of the surgeon, that the symptoms were somewhat different in the beginning, from what they were when first I had occasion to observe them: petechiæ and other
dis-

discolourations of the skin were then more common, and the head was likewise more frequently affected.

Description of the Fever.

THE disease in general attacked suddenly, and the stomach was always the part first affected; a very disagreeable feeling and sinking at the præcordia, or at what is called the pit of the stomach; a degree of nausea and giddiness were the first symptoms, which were soon accompanied with a pain immediately above the eyes and at the temples, or a dull pain at the back part of the head. The sick complained also in the beginning of coldness and chilliness, seldom of thirst, always of great weakness and debility, had a tremor upon them, sighed frequently, and when asked any questions about their complaints, universally put their hand to the region of the stomach,

stomach, expressing in the strongest manner, that there was the chief seat of their uneasiness and sufferings; their countenance was commonly pale and dejected, and their eyes looked dull and heavy, though the tunica albuginea of the eye was of a clear white; their tongue was moist, and covered with a cream coloured slough or mucus: they were in general costive, with the abdomen tense and hard; the pulse was for the most part small and fluttering, in some few instances it was but little altered from a natural state, although the danger was not less on that account. The sick seemed always drowsy, and commonly remained in a state of dozing or slumbering during the whole course of the disease; but when spoke to they awoke readily, and when quite awake gave distinct answers to any questions put to them. Few were permanently delirious or comatose, unless for some short time before their death, and many, as I was informed

formed by the Spanish clergyman who attended them, were sensible to the very last.

Mr. Kentish, surgeon to the hospital, informed me, that upon the first appearance of the distemper, or soon after the arrival of the Spaniards, he had, in some few instances, observed swelling of the parotid glands and petechial or purple spots on the skin; but certainly, during the whole of my stay at Winchester, neither discolourations of the skin, miliary eruptions, hemorrhages, parotids, nor bubos, could be justly enumerated among the symptoms of the disease. Many of the sick complained of a sore throat, or of pain and uneasiness in swallowing; some were seized with a difficulty in breathing and other pneumonic symptoms; one man had an abscess in the liver; but in the greater number of those who died, excepting the uneasy sensation at the region of the stomach, there was no appearance of local inflammation or of local disease: so deceitful

ceitful indeed was this distemper, that several, who (judging by their pulse or even countenance) had but a slight appearance of indisposition, died in twenty-four or indeed in twelve hours after their reception into the hospital. The blood taken away in this fever was (as I was * told) of a loose texture and cohesion, though the smell of the sick or of their evacuations had nothing in them remarkably offensive or putrid. From observing this circumstance, and that petechiæ, vibices, or hemorrhages, rarely occurred, that the sick, in general, retained their senses, were able to raise themselves in bed, and to assist themselves with what they wanted; I could not at first allow myself to think that the disease was of so malignant a nature, or that the danger was so great as had been represented to me; but I was soon convinced of my error by seeing the numbers that perished daily with all those flattering appearances.

* None of the sick were bled by my desire.

It has been frequently remarked, that, in malignant fevers, the danger cannot be estimated by the state of the pulse, or from the ordinary symptoms of the disease; but there never was a more striking illustration of the truth of this fact than the present instance afforded; all that could be known was, that a person seized with this fever run the greatest risk of his life be the symptoms ever so favourable: even those who escaped from the more immediate danger of the disease, recovered in general very slowly, were a long time weak and subject to returns of fever, or they fell into chronic disorders which in the end proved no less fatal. Those who suffered a relapse commonly died; there was scarcely, I believe, an instance of a person being a second time dismissed from the hospital.

To the preceding general description of the disease, taken from the appearances and relations of the sick, I shall subjoin an account

count of it in my own particular case, in hopes of throwing a still greater light on the nature of this distemper, as every person knows that we describe better what we feel, than what we only see ; and that we attend with much more accuracy to our own sufferings than to those of others.

Description of my own Case.

ON the fourth day after my arrival at Winchester, I was engaged, for a considerable part of the morning, in the agent's office, (a room within the prison) attending an examination of the nurses of the hospital, respecting a complaint made by the sick against the surgeon ; as likewise an examination of some of the prisoners who, having attempted to escape, had been confined for some days in the cashot or black hole. Whilst in the house I felt no inconvenience, but upon coming out into the
open

open air I found myself extremely giddy, with a considerable degree of nausea or sickness, which however soon went off. Before dinner I took some tincture of bark in a glass of water, and dined in my usual way, only that I drank rather more wine than I commonly do; after dinner I had no return of sickness nor of giddiness, but twice or thrice in the evening I had a very uncommon feeling at the pit of my stomach, and which it is impossible to describe; it was a kind of sudden sinking or faintness, and which seemed, for an instant or two, to stop the motion of the heart, but it went soon off, and I imputed it to the quantity* of wine I had drank at dinner. At night I ate no supper, drank a glass of very weak punch, and went to bed seemingly in perfect health, and without the smallest suspicion of my having caught the distemper. About the middle of the night I awoke from sleep with the symptoms of

* The quantity did not exceed a pint.

the most violent fever : I was not sensible of any preceding chilliness or coldness, but the sense of heat, and the oppression at the præcordia, exceeded all description.

The uneasiness and oppression caused a constant involuntary sighing, whilst the sensation of heat gave me the idea of liquid fire spreading from my stomach across my breast, along the course of the pectoral muscles, and down the insides of my arms to the extremities of my fingers. The heat however was not uniformly the same, but seemed to come in flashes, as if fresh inflammable matter had occasionally been thrown on the fire. Notwithstanding those dreadful sensations, I perceived that my pulse was regular, and that the frequency of it was by no means in proportion to the degree of heat and oppression. In the morning, about seven o'clock, I took an opening medicine, consisting chiefly of rhubarb and *kali vitriolatum* ; after the operation

of which I drank some tea and attempted to dress myself; but, when out of bed, I found myself so extremely weak that I could hardly stand, and so giddy that I was unable to walk across the room without risk of falling, and my hands trembled in such a manner that I could not write. My tongue was moist, but compleatly covered with a cream coloured mucus; I also felt cold and chilly, and was obliged to have a fire made in my room. During the day I could eat nothing; even the smell of any kind of broth or animal food occasioned sickness, and was particularly disgusting to me. In the afternoon I took, at intervals, nine grains of emetic tartar dissolved in water, which operated four or five times with considerable violence; in the evening I bathed my feet in warm water, and at going to bed took a bolus, composed of James's powder, calomel, and theriaca, drinking afterwards a small basin of white wine whey.

This

This medicine occasioned no sickness ; I passed a very good night, and in the morning, finding myself free from fever, was in hopes that I had succeeded in expelling the contagion entirely ; but my hopes were too sanguine, and I was soon convinced that I had to deal with an enemy that was not so easily overcome. When out of bed I felt myself much weaker than I expected ; I had not indeed either giddiness or oppression at the præcordia, but my tongue was still extremely white, and a very unpleasant sensation remained across my breast, with a sense of numbness in the inside of my arms, extending along the course of the nerves : I had no headach, and my appetite was much as usual. After breakfast I rode out in a chaise for an hour or two ; and, in the course of the day, took twice or thrice some tincture of bark in water. Towards evening I was again chilly. At going to bed I repeated the antimonial bolus, as on the preceding night, but with-

out the calomel, the other having given me two or three motions. I did not pass this night so pleasantly as the former; for though I had no oppression at my stomach, nor burning heat, I could not sleep, was extremely restless, and my pulse was quicker than natural. The day following I again rode out in the morning, and took the bark in substance three or four times. My appetite was still pretty good, but the whiteness of my tongue and numbness of my arms remained as before, with a degree of chilliness always recurring in the evening, and my sleep was interrupted and unrefreshing. In this state I continued during the whole of the week; that is, from the Monday night, when I was first seized, to the Sunday following; when Commissioner Lulman, of whose friendship on this occasion I shall always retain the most grateful remembrance, and whose humanity can only be equalled by the attention with which he discharges every part of his duty, thinking that

that a change of air might be of advantage to me, proposed that, when the business of the day was over, we should ride to Southampton, and pass the Sunday there. I readily embraced the proposal, and accordingly we went to Southampton to dinner. I seemed to derive very great benefit from the change of air, and particularly from the sea-air, which at all times is grateful to me. We walked after dinner on the beach, and in the evening, excepting the numbness in my arms, which I still perceived, I felt myself in my usual health; went to bed early, and without supping, in full confidence of passing a good night; but in this I was greatly disappointed, for I was no sooner in bed than I became restless and uneasy, and, after tossing about for some time, a violent fever came on without any previous coldness or chilliness. My pulse was much quicker than ever I remember to have felt it, or indeed that of any adult who was not in the agonies of death. The heart seemed

rather to vibrate than to beat ; the heat of the body was also very great, especially that sensation formerly described, of liquid fire spreading across my breast and down my arms ; but I had not the same oppression at the præcordia as when I was first seized with the distemper. I had neither headach, pain in my back, nor thirst ; and, excepting the burning heat in my breast and arms, I suffered no particular uneasiness but what arose from the agitation of the heart, and the uncommonly rapid circulation of the blood. This paroxysm, after having continued for about an hour, (having no light in my room I could only guess the time) terminated in a profuse sweat ; during which, the heat of the body and quickness of the pulse subsiding, I fell asleep ; and, in the morning when I awoke, found myself so very well, that I could hardly believe the reality of what had happened during the night. I now flattered myself that, as this was the first time I had perspired

spired during my illness, it was a kind of crisis, by which the disorder would be completely removed; but in this belief I was soon undeceived, for the numbness continuing in my arms, and a degree of chilliness recurring every night, with disturbed and unrefreshing sleep, convinced me that there were still some remains of fever hanging about me. My indisposition however was not so great as to prevent my going on, in the prosecution of the business in which I was engaged; neither was I sensible of receiving any fresh contagion, nor of suffering any aggravation of symptoms, until the day before I left Winchester; when, remaining longer than usual in the hospital, having gone through every ward, and examined, I believe, every patient in it, I perceived on coming out some of the same symptoms as when I was first attacked with the distemper. Determined however to try what change of air would do in removing them, I mounted my horse,

and rode with Mr. Lulman some miles into the country. We dined at a neighbouring village ; and, after dinner, I felt so well that I began to suspect my feelings in the morning had been occasioned more by the recollection of my past sufferings, than from any fresh contagion ; but the following night fully proved the reality of my first apprehensions, as during that I experienced an attack of fever, exactly similar to what happened when I was first seized with the distemper ; the same anxiety, sighing, and oppression at the region of the stomach ; the same feeling of fire extending across my breast and down my arms ; my pulse also was extremely quick, though nothing like what it had been the night I slept at Southampton. In the morning, finding myself greatly indisposed, with a return of vertigo, tremor, debility, white tongue, loathing of food, &c. I again had recourse to the emetic tartar in solution, of which I took eight grains, at intervals, until it vomited me pretty severely.

It

It was my intention to have remained some days longer at Winchester, at least until I had received letters from town ; but Mr. Lulman, whose friendship had a right to determine me, urged so strongly the necessity of my returning home whilst I was in a situation to travel, that I yielded to his intreaty, and at eleven o'clock set off in a post-chaise for London, and reached town that evening. I bore the journey better than I expected, considering my extreme weakness, and that, loathing every kind of food, I could take no nourishment on the road.

Soon after my arrival at my own house I went to bed, taking the antimonial bolus as before ; the fever returned again in the night, but by no means so violent as on the preceding one : towards morning a perspiration broke out, and as I found, from this circumstance, that the heat of the body was lessened, and the pulse diminished in frequency, I kept it up until I obtained a
complete

complete intermission of the fever, and then began the liberal use of the bark.

I remained, however, for several months, very weak and languid, although I had recourse to sea bathing, and took emetics from time to time, which I found absolutely necessary for me ; but nothing I either took or did removed the disagreeable feeling in my breast and arms, until, the winter following, I applied a blister to the sternum ; this occasioned an eruption of very painful carbuncles all over my breast, and an eruption somewhat similar to this afterwards came out on the back part of my head ; but, notwithstanding those efforts of the constitution to expel this poison, I can with truth say, that I have ever since been subject to complaints and symptoms, to which I was formerly a stranger ; nor will any person be surprised at it, who is acquainted with the virulence and malignity of such a distemper as I have just now described.

Perhaps

Perhaps, in the foregoing description I may be thought to have been too minute or prolix, but my apology is that, for what I know, I am the first physician who has suffered an attack of the jail fever, and lived to give an account of it. My sufferings however, from this cause, were greatly alleviated by the idea of the relief I had afforded to others; and they would indeed be matter of triumph to me, could I flatter myself that the description of them would prove a future benefit to mankind.

At all events I have the satisfaction of having endeavoured, to the utmost of my power, to accomplish this object; and therefore may truly affirm — *Si secuta fuerit quæ debet fortuna, gaudebimus omnes; sin minus, ego tamen gaudebo.*

Of

Of the most remarkable Symptoms of the Winchester Fever, or of such as were peculiar to this Complaint.

HAVING finished the description of the disease, it is proper, in the next place, to point out those symptoms which seemed peculiar to this fever, or which distinguish it from other similar distempers.

“ A very disagreeable feeling, and sinking, at the præcordia, or pit of the stomach.”

It is well known, that the stomach is generally more or less affected, in all contagious fevers accompanied with eruptions; such as, the small-pox, measles, and scarlet fever; although, in the second, the bowels are perhaps oftener affected than the stomach, and, in the third, sometimes the stomach, sometimes the bowels, and frequently both. Pain and oppression at the region of the stomach is also not
an

an uncommon symptom in the hospital or jail fever ; but I do not remember to have seen this symptom so constantly present and permanent, through the whole course of the disease, as in the present instance.

“ Few were permanently delirious or
 “ comatous, unless for some short time be-
 “ fore their death, &c.”

In most contagious and malignant fevers, the head is the part principally affected ; and the sick are commonly delirious, if not from the beginning, at least in the course of the disease. Convulsions likewise, in consequence of this, frequently occur ; and the fever usually terminates in this way. From dissections also it appears that the brain suffers in a particular manner, and that the immediate injury done to this organ has probably caused the death of the patient. But, in the Winchester fever, though the nervous system was immediately and very considerably affected, as was
 4 evident

evident from the vertigo, tremors, sudden debility, irregularity of the pulse, and particular species of headach; yet the usual or more obvious functions of the brain suffered less derangement, than in many other less malignant fevers; and the derangement that took place seemed to arise more from the state of the stomach, than from any primary affection of the head.

“ The sick seemed always drowsy, and
 “ commonly remained in a state of dozing
 “ or slumbering, &c.”

This symptom accompanies all diseases where there is a strong tendency in the system to putridity, and therefore not unfrequently occurs in the more advanced stages of putrid fevers; but I have never met with it so early in the disease, nor so uniformly present from the beginning, as in the Winchester fever. I have often had occasion to remark the same symptom in the second stage of the putrid sore throat, and have, in some cases, seen it prove of
 fatal

fatal consequence ; from the nurses, or those employed about the sick, mistaking this dozing for natural sleep, which they thought it would be improper to interrupt by giving food or medicine.

“ Their eyes looked dull and heavy,
 “ though the tunica albuginea of the eye,
 “ was of a clear white, &c.”

This appearance of the eye I never saw in any malignant or contagious fever except the present ; and, previous to my going to Winchester, I had concluded, as the result of my experience, that a turbid appearance, or redness, of the tunica albuginea of the eye, was a constant and distinguishing symptom of a fever of the contagious kind. It is so in the small-pox, measles, scarlet fever, &c. and I had observed the same kind of appearance in all those jail or hospital fevers which I had formerly seen. I had not however been long at Winchester, before I was convinced of the danger of establishing general observations ; and, as I could

not resist the evidence of my sight, was obliged to confess that, in the generality of the sick, the white of the eye had more of the pearly whiteness observable in consumptive persons, than the redness, or turbidness, usual in contagious fevers.

“ Their tongue was moist, and covered
 “ with a cream-coloured slough or mucus,
 “ &c.”

This appearance of the tongue cannot be said to be peculiar to this fever, but it remained longer than is usual in similar cases; in general, the tongue soon becomes red, or black, and is almost constantly parched, when the fever has continued any considerable time.

“ In the greater number of those who
 “ died, excepting the uneasy sensation at
 “ the region of the stomach, there was no
 “ appearance of local inflammation, or of
 “ local disease.”

In most malignant fevers, where the disease proves fatal, it has been remarked that
 the

the brain, lungs, intestines, or in short some viscus immediately necessary to life has been affected by inflammation, which suddenly terminating in gangrene, causes the death of the patient: but this termination was by no means frequent in the disease in question; for, although it be true, as I have already stated, that there were some examples of inflammation affecting the fauces, the lungs, the liver, and also the intestines, yet in the far greater number of those whom the fever destroyed, there was no reason to apprehend that any such circumstance had happened, or had caused the fatal catastrophe.

The present contagion, in its effects, had much more resemblance to a sedative poison, acting immediately on the stomach, and indirectly on the heart, whose motion it weakened and finally destroyed.

The jail distemper at Winchester afforded likewise a striking example of a highly contagious and fatal fever, accompanied by

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few

few of those symptoms that have been looked upon as characteristic, or inseparable from diseases of the putrid or malignant kind: neither petechial, nor any other discolouration of the skin, hemorrhages, rash, parotids, or bubos, were common symptoms in this fever; and yet the disease proved almost as fatal, and often as suddenly so, as the real plague or pestilence; which plainly shews how little those symptoms are to be considered as the distinguishing marks of malignity in fevers, the only criterion perhaps of which is the sudden debility, dejection, anxiety, giddiness, and tremors, when unpreceded by any considerable evacuation, either natural or artificial.

Causes

*Causes which contributed to the Mortality of
the Spanish Prisoners at Winchester.*

To those who are acquainted with the great attention paid by this country to the treatment of prisoners of war ; who know the healthy situation of Winchester, the largeness and airiness of the prison wards, with the convenience and advantage of the airing ground, &c. &c. it will possibly be matter of surprise, that even a jail distemper should continue to rage for so long a time, and with such fatal violence, as was the case in the present instance. The subject certainly requires some explanation, and it may not be improper to give it in this place.

The seamen of Don Langara's fleet had been long confined on board their ships before they sailed from the ports of Spain ; from which circumstance, added to their

want of cleanliness, the virulence of the contagion had arisen to a very high degree before they came to Winchester.

2dly. They brought with them all their clothes and bedding, which were well calculated to retain the contagion, and proved the great source or fomes of it.

3dly. They were so much afraid of the cold, and particularly of the dampness of our climate, that they kept the hospital and prison wards as closely shut up as they could; for the same reason, they remained much in bed, or, when out of bed, were constantly wrapped up in their cloaks or mantles. Nor was it possible when I first went there, without using violence, to prevail on them to go out into the airing-ground; and it was still more difficult to get them to take out their bedding, for the purpose of exposing it to the open air.

4thly. Many of the prisoners belonged to the Caracca company, and had private adventures on board: these men, when captured,

captured, having lost their all, were particularly low spirited, and consequently were more liable to suffer from the distemper. It was remarked, that they were the first who were seized with it, and most of them died.

5thly. The Spaniards, owing to some dispute they had with the surgeon, entertained prejudices against him, and were therefore unwilling to complain, or to apply for admission into the hospital, till it was too late to derive benefit from any medical treatment; they even concealed their indisposition as long as it was in their power. In passing through the courts of the prison, I have observed at different times, some of those poor people, unable to stand, their countenances pale and dejected, lying along by the walls of the building which were most exposed to the sun; and, notwithstanding this exposure, and their being wrapped up in their cloaks or mantles, they were shivering with cold like a person in a fit of the ague. I shall never forget how much I

was shocked the first day I entered the hospital, at being obliged to step over a poor man, who was lying across the threshold of the door, either dying or dead.

6thly. It must also be acknowledged, as another cause of the mortality, that owing to the number of sick increasing so rapidly and unexpectedly, they could not be properly accommodated in the hospital, which was by much too crowded.

The above circumstances, without including many others of less importance, and which it is unnecessary here to detail, will serve, in a great measure, to explain the mortality that happened. I shall therefore now proceed to a more interesting and important question, *viz.* to determine if possible the particular nature of the jail contagion.

*Of the Nature of the Contagion, which gives
rise to Jail and Hospital Fevers.*

THAT we may be able to form a more accurate judgment of the nature of the contagion, which gives rise to this species of fever, we shall consider it under four different points of view.

In the first place, how it is generated; 2dly, in what manner it is propagated, with the circumstances more or less favourable to its communication; 3dly, its effects on the human body; and, 4thly, the means of weakening its virulence, or of entirely destroying it.

Whoever has considered contagious fevers with attention must have observed, that they are of two very distinct classes. The first may properly enough be called *specific contagions*, as they do not arise from any general quality, or process of nature, with

which we are acquainted; and, as they have a peculiar origin, they excite diseases of a peculiar kind; differing in many respects from every other, but in nothing more remarkably, than in this, that the peculiar disease can only take place once in any individual; and there are some persons, in whom this contagion never can produce any morbid symptom. How many peculiar or specific poisons there are in nature is not yet ascertained; but the small-pox and measles are evidently such to man, and we know likewise that there are others peculiar to certain animals.

The second class of contagious fevers, may be named *general contagions*, as they arise from a general cause; or they may be named *putrid*, as they will be found, in every instance, to be the result of putrefaction; a process, probably, the most general in nature with which we are acquainted, and to which all vegetable and animal substances, under certain circumstances,

stances, are liable. That the contagion, or miasma, of the jail and hospital fever is of this kind, admits of every species of evidence a matter of fact and of observation can do.

We remarked, in the beginning, that this disease is constantly produced where a number of people are shut up together in a close place, without the greatest attention to cleanliness, and a renewal of the air. We know, that all the excretions of the human body have made a certain advance or progress towards putridity, and that, placed in circumstances favourable to putrefaction, they soon become highly putrid. We are certain, that of all the human excretions, none is more highly animalised, or so susceptible of becoming putrid, as the perspiration or vapour issuing from the surface of the body and lungs. We know also that the perspiration even of vegetables, confined under similar circumstances, becomes putrid, and in a high degree noxious to man: a *fortiori* then,

then, we may conclude, that animal perspiration undergoes a similar alteration, and will prove still more noxious.

We find also, that the contagion, resulting from animal perspiration, shews its baneful effects more quickly, and more forcibly, in proportion to its quantity, and to its being placed in circumstances the most favourable to putrefaction; consequently, in proportion to the size and closeness of the place, the temperature and moisture of the air, and the additional or accessory putrid matters with which it is combined.

We find likewise, that the formation of this contagion is prevented by causes that renew the air, and carry off the perspiration, or prevent its tendency to putrefaction.

We observe also, what may be considered as an analogical proof, that a contagious vapour, differing only in degree of virulence from the human miasmata, is constantly produced from water alone, and still more from water mixed with vegetable

ble and animal matters, when exposed in sufficient quantity and under circumstances favourable to putridity ; but the septic nature of the jail contagion will be farther illustrated, by what we have to notice of its effects on the human body, and of the methods of destroying it, or of rendering it harmless.

Of the Manner in which Contagion is communicated.

EVERY person knows that contagious fevers, whether *specific* or *putrid*, are propagated by an immediate communication with the sick, either by contact or contiguity. How far the contagious atmosphere extends, is impossible to ascertain, as this must admit of great latitude, according to the virulence of the disease, situation of the sick, season of the year, state of the atmosphere, &c. My ingenious and respectable friend

friend Dr. Haygarth is of opinion, and indeed has shewn, that in the small-pox it is much more limited than was apprehended. But it is not only from a direct communication with the sick that contagious fevers are propagated ; unfortunately, the persons and clothes of those who remain long in a contagious atmosphere, and the excretions of the sick, are capable (even when conveyed to a great distance, or preserved for a length of time) of producing the same mischief as an immediate communication with the sick themselves. Of this fact the examples are so numerous as to put the matter beyond the possibility of a doubt. Here again, the opinion of my friend Dr. Haygarth differs from the opinions formerly entertained by physicians. For, though he admits, that the variolous matter, and the more sensible excretions of the sick, are capable of communicating the disease, and, if close shut up, of retaining that power for a long time, he does not think, that the contagious

gious vapour, immediately arising from the sick, can be retained by the clothes of those confined in the variolous atmosphere, or by the furniture in the chambers of the sick, so as to communicate the disease to such as have not themselves been immediately exposed to it. No one can have a greater respect for the opinions and observations of Dr. Haygarth than I have, as no person is better acquainted with his candour and accuracy. I readily agree with him, that the dread of those terrible diseases, and the natural fears of men, have possibly magnified the danger beyond reality; that the risk of propagating the contagion in this manner is by no means so great as had been supposed; and that physicians, or even apothecaries, are seldom so long exposed to this atmosphere, as to be in great danger of conveying the contagion elsewhere; but I cannot go so far as to believe that the persons, and especially the clothes of nurses or assistants, who are constantly

stantly confined in the chambers of the sick, sometimes not very well ventilated, will not imbibe the contagious vapour to such a degree, as to be capable of communicating it, especially where they have a direct or immediate intercourse with a person susceptible of the disease. But, putting the small-pox and other *specific contagions* out of the question, that the jail distemper and *putrid contagions* are frequently conveyed in this manner, cannot be denied. Indeed, wherever a vapour can be distinguished by the smell, we have the demonstration of our senses for what a length of time, not only clothes, but furniture, and even the boards and walls of houses will retain it: therefore, in respect to the contagion of the jail or hospital fever, we may safely affirm, that it affects not only those who are immediately exposed to the original atmosphere, but that this contagion may certainly be communicated by the clothes of persons who have
for

for any length of time been confined in it ; and, what is still more surprising, even when the persons themselves have suffered no injury, nor had any disease in consequence.

This fact being ascertained, we cannot wonder if those who are seized with the jail fever, owing to such communication, should during their illness generate a contagious vapour ; but, however paradoxical it may appear, I have never observed that the sick propagated the disease so readily, as the bodies and clothes of those who, though well, had been long confined in the original atmosphere. From my own experience also, I am led to conclude, that there is little risk of receiving the contagion from dead bodies, even from dissecting them, provided the surgeon does not cut himself during the dissection, the consequence of which has generally proved fatal.

There are several other circumstances, worthy of notice, that increase or diminish

nish the facility with which contagion is communicated. Unless where contagion is very powerful, it is seldom propagated in the open air; I knew only one instance of this at Winchester. It is much more certainly communicated in a room, and especially if there is a current of air, from the contagious person to others capable of being affected. A moist atmosphere is also more favourable to the communication of contagion than a dry one. A contagious person becomes greatly more so, if his clothes are wet, and his body heated by exercise, so as to be in a state of perspiration. Those most susceptible of contagion are, young persons, particularly if they come directly from a pure air into the infected atmosphere; persons whose minds are oppressed with fear or anxiety; or who have been weakened by previous illness; even those who have been fatigued, or are fasting, more readily than others whose strength has not been impaired,

paired, or which has been again recruited with food. It has been farther remarked, that persons who have issues are seldom affected by contagion.

Of the Effects of putrid Contagion on the human Body.

PUTRID matter, in whatever way generated, if in sufficient quantity, has always some deleterious effect; or, in other words, acts as a poison upon the body. It is true, that the human stomach, and still more remarkably, the organs of digestion of certain animals, have the power of counteracting the septic tendency; but this power, in our stomachs at least, is very limited; and when any matter, whether generated in the body or introduced from without, has acquired a degree of putridity beyond this, it occasions nausea, vomiting, purging, great oppression

pression at the region of the stomach, and often a fever, either of the intermittent, remittent, or more continued kind. Putrid matter, directly introduced into the system by means of a wound, causes swelling and inflammation of the lymphatic glands, often terminating suddenly in gangrene, along with the symptoms of a fever, greatly resembling the hospital or jail fever: the same prostration of strength, tremors, anxiety, headach, and delirium; with the same irregularity in the pulse, and, if the disease continues, it induces those appearances of the skin, hemorrhages, and other symptoms, that indicate a relaxation of the solids, and resolved crasis of the blood. The fevers that arise in consequence of exposure to putrid vapour or contagion, assume a variety of types and forms, according to the various circumstances of combination, degree of putridity, season of the year, constitution of the patient, &c. But they, as well as the preceding, will be found

found to have many symptoms in common, and similar to the jail and hospital fever: and in reality all the fevers of this class, from the slightest vernal intermittent to the true plague, are only different shades or varieties of the same disease, and productions of one common cause, viz. putrefaction. I shall not however prosecute this subject farther at present, as I have treated it more fully in another work, which, should I hereafter have leisure to complete, I hope to render not altogether unworthy of the public eye.

The contagion then of the jail or hospital fever, may justly be considered as one of the most subtil and powerful vapours of the putrid kind; and, consequently, its immediate and destructive effects upon the body are not to be wondered at. In ordinary cases of fever, the vital principle is roused into action, and Nature is commonly sufficient of herself to remove the morbid

cause; but here, as in the real pestilence, the contagion introduced into the body, seems to act as a narcotic poison upon the heart and nervous system, suppressing the principle of life, instead of rousing it to the conflict. In this distemper therefore, where nature can do so little, and even art, unless immediately called to her assistance, is equally unavailing, it is of the utmost consequence for us to know whether the contagion cannot be prevented or destroyed.

*Of the Means of preventing, and of destroying,
the Jail Contagion.*

As we are perfectly acquainted with the causes of the jail contagion, we could certainly prevent its formation, provided the means of doing so were always in our power; but as we cannot command these, our next object is to endeavour to correct, or destroy it, when formed. As a knowledge of the
nature

nature and origin of the jail contagion naturally led to the proper and effectual means of correcting or destroying it, so, on the other hand, the means that have been successfully employed to destroy it, afford the most convincing evidence of its true nature. Every species of contagion has its virulence lessened, and is at last completely effaced, by exposure to the open air. Whether the atmospheric air has the power of dissolving contagion, (according to Dr. Haygarth) or only diffuses it, in such a manner as to render it harmless, cannot possibly be ascertained, nor is it of any importance to know. Water possesses the same power as air, and may be employed with equal success, in removing contagion from clothes or furniture. In respect to *specific contagions*, unless it be exposure to the open air, or to a stream of water, we know no means of destroying them, or even of blunting their activity. The case is not the same with putrid

contagions ; whose virulence is often blunted, or the contagion entirely destroyed, by certain degrees of heat or cold. There are likewise many vegetable and mineral substances, which possess the power of resisting or counteracting putrefaction ; but as these, in general, can only be employed in a solid or liquid form, they can be of no service in destroying a putrid vapour, which cannot be acted upon but by antiseptics in the same state. Many things have been used for this purpose, but the history of those trials, and a more accurate knowledge of chemistry, are sufficient to convince us of their inefficacy. My attention having been particularly called to this subject, and my character involved in the success, I was satisfied, after the most deliberate reflection on the nature of putrid contagion, that nothing could so certainly or efficaciously destroy it, as the mineral acids in a state of vapour ; but how to employ these, with safety, was the difficulty—*Hoc opus, hic labor.* The
fumes

fumes of sulphur, which are so successfully made use of to fumigate clothes or furniture, could not be employed, either in hospital or prison wards ; as these fumes are well known, even in small quantity, to prove immediately destructive to animal life. I had frequently remarked, that the fumes of the nitrous acid, did not affect the breathing in the same manner, notwithstanding which, I conceived they might prove of equal efficacy in destroying or diminishing the virulence of contagion ; and the success attending the employment of these at Winchester, as well as many trials which I have made, both in private and in the Middlesex hospital, have convinced me of the power of the nitrous acid, in destroying contagion, and likewise of the safety with which it may be used. But, as I purpose to give a more full description of this matter in the Appendix *, I shall now proceed to relate the means

* Vide Appendix,

employed by me at Winchester, to destroy the contagion in the prison, and for the cure of the sick in the hospital.

Treatment of the Prisoners, and Means employed to purify the Prison and Hospital Wards.

UPON my arrival at Winchester, the first object that seemed to claim my attention, was the enlargement of the hospital ; which I found could easily be accomplished, as there were several empty wards adjoining, that might, in a few days, be fitted up for the reception of the sick. I therefore gave orders that this should be immediately done ; at the same time, to insure the free admission of air, so necessary for their recovery, I directed that the casements of most of the windows should be removed, and the windows leverboarded * ; that the chimneys in

* The name given by the tradesmen to a coarse kind of Venetian window-blind.

the different wards should be contracted into narrow flues, and a fire kept constantly in each ; and that, close to the cieling, circular openings should be made in the walls separating the different apartments, which would allow an uninterrupted circulation of air through the whole, now capacious enough, with the proposed addition, to contain three hundred men. But, whilst I was engaged in this most necessary work, my attention was called off, by information I received of the sick list increasing so rapidly that, unless some check was given to the contagion, the addition made to the hospital, and twice as much, would soon be insufficient for the accommodation of those who were daily seized with the distemper. I now perceived, that I had begun at the wrong end of the business ; that it was necessary to give my first attention to the prisoners, and, although I might not immediately succeed in destroying the contagion, I must at least endeavour

vour to lessen the violence of it ; that, this being done, I should have room enough for the sick, and sufficient leisure to attend to them. I therefore, after again examining with attention the prisoners and prison wards, adopted the following plan.

I divided the whole of the prison wards into four parts ; and, lodging the prisoners, which could easily be done, in three of those parts, I set aside the fourth for the purpose of purification, which was conducted as follows :

After removing all the hammocks, bedding, &c. from the wards, they were first thoroughly cleaned out ; then the hammock posts were well washed with diluted marine acid, and the same thrown, by means of garden watering machines, to the upper parts of the posts, as high as the cieling. The wards, when dry, were closely shut up, and pots placed in them, at different distances, containing from half a pound to a pound of nitre, which was
deflagrated

deflagrated by an iron heater, put into each pot. The wards were then shut up for some hours, and, when opened, were exposed to a free ventilation. After this process had been once or twice repeated, the wards were again furnished with fresh hammocks, palliasses, and bedding, instead of the old bedding, &c. which was entirely taken away. Having thus prepared the wards, I ordered as many of the prisoners, as could be lodged in them, to be taken to the river in companies, about one hundred at a time. They were there stripped, washed, and new clothed: all their old clothes being carefully removed, they were brought back to the prison, and lodged in the prepared wards. The good effects of this plan, so far as it could be carried into execution, was immediately felt; as none of the prisoners*, so managed, were afterwards seized with the

* About three hundred.

distemper;

distemper ; but, as we could not procure a sufficient quantity of fresh clothes and bedding, we were obliged to supply this defect by fumigating and purifying those which we had taken away, and delivering them again to their owners.

We employed the new clothes and bedding for the second division, as we had done for the first. The third division of the prisoners was treated in the same manner, and the same means were employed for purifying the different prison wards ; the effects of which, in effacing the contagion, appeared directly, from the great diminution in the number of the sick *. Fearing, however, that the distemper might again break out amongst them, from some latent seeds of contagion still adhering to the clothes or bedding, I desired that the prisoners should every morning be reviewed, and particularly examined respecting their health, by their

* Vid. Hospital returns. Appendix.

own surgeon ; and, as the Spaniards were by this time sensible of the attention paid to them, and already experienced the good effects of it, they now of themselves (what at first could not be obtained without compulsion) took out their hammocks every day to the airing ground, and, when the weather would admit of it, exposed their * bedding to the open air during the greater part of the day. I had also a shed erected for their walking under when it rained, and a ward or two set apart for their dining, and did not suffer them to enter the wards where they slept, until the evening ; taking care to have these wards fumigated, and well ventilated every day.

Having finished with the prison, and prisoners, I again returned to the hospital, and found the seven new wards, which I had ordered to be fitted up, ready for the reception of the sick : they were, in part,

* I had drying posts and lines put up in the airing ground for that purpose.

furnished

furnished with new beds ; but, as we had not a sufficient supply of these, we were under the necessity of using some of the old ones ; those however I took care to have first fumigated, then washed with hot soap suds, and afterwards with diluted marine acid. When every thing was properly prepared, in these new apartments, I had such of the sick as could without danger be removed brought into them ; and, by this means, emptied some of the old hospital wards ; which with the beds and bedding, were immediately fumigated, cleaned out, and prepared in the manner already described. Proceeding in this way we, in a few days, got the whole of the hospital put into a proper condition : and, when any of the sick died, I ordered that the bed and bedding should always be removed, and not employed again until it underwent a fresh fumigation and cleaning. The not having attended to this necessary precaution, had certainly been destructive to many ; the
beds

beds and bedding proving fatal to those who were put into them.

Of the Cure of the Jail Fever.

BEFORE I make any observations on the proper method of treating this fever, I shall transcribe some directions given by me to the Spanish Surgeon, as well as to our own, with the general regulations laid down respecting the hospital.

Directions to the Spanish Surgeon.

THE Spanish surgeon is requested to review the prisoners every morning; when any man seems indisposed, to examine particularly his complaint: and if there is reason to apprehend that he is affected by the contagion, he is immediately to be treated in the following manner.

He is, first, to have the common purging glyster administered ; after the operation of which, he is to take the emetic mixture every ten minutes or quarter of an hour, until it has had a proper effect ; at going to bed, the *bolus antim. cardiac*, with a basin of mutton broth, or ptisane. If, next morning, the symptoms of fever have in great measure disappeared, he is to be treated as a convalescent, and, as such, must take, twice or thrice a day, the *haustus e cort. peruv.* He is to have a glass of wine after dinner ; his diet to consist of broth or rice ; and no meat nor cheese to be allowed, until he is perfectly recovered. If the symptoms of fever should continue, or increase, after this treatment, the sick person is then to be sent to the hospital, and delivered over to the care of the hospital surgeon.

Directions

Directions to the Hospital Surgeon.

WHEN a man is brought to the hospital with the symptoms of the jail fever, he is, in the first place, to be sent to the bathing room, and bathed for ten minutes in water, at the temperature of 100 of Fahrenheit's thermometer; all his clothes are to be removed to the fumigating house; after bathing, he is to have an hospital shirt put on, and, being wrapped up in a blanket, must be conveyed to the hospital, either in a hammock or sedan chair. When put to bed, he is to have the common glyster administered, and afterwards is to take the tartar emetic solution, unless where that medicine has been previously given by the Spanish surgeon, conformably to his instructions. Soon after the operation of the emetic, or immediately, where that has been already

* I had a bathing room, with two hot baths, constructed in the hospital at Winchester.

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given,

given, he is to take the *bolus antimon. cardiacus* *, with four spoonfuls of one or other of the mixtures, N^o 7 or N^o 8; and these medicines are to be repeated (varying them according to the symptoms) every four or six hours. It may perhaps, in some cases of extreme weakness, or in the second stage of the disease, be adviseable to substitute the peruvian bark, in some of the forms subjoined †, instead of the above mentioned antimonial medicine, &c. but this is left to the judgment and discretion of the surgeon. I will only suggest, that where extreme debility, or the tendency to gangrene require the bark, we are not to expect or wait for an intermission or remission of the fever. The bark, in such cases, may always be safely administered, if the tongue is not parched, nor the skin dry, when there is no difficulty of swallowing, nor the breathing much

* Vid. Appendix. Form. medicam.

† Vid. Idem. eodem.

oppressed.

oppressed. But, under those circumstances, I think it neither safe nor useful, and would most undoubtedly prefer the medicines of the class first prescribed. Wine is proper in most stages of the disease, unless where the inflamed appearance of the eyes, with a flushed countenance, and the violence of the patient, give reason to apprehend a phrenzy, or inflammation of the brain, when wine aggravates the symptoms, and perhaps hastens the fatal termination. But, where wine is proper, it should never be left to the discretion of nurses, but administered either by the surgeon himself, or by the dispenser, who may, with very little trouble, give it to the sick in his daily rounds; distinguishing also, by this mark of attention, those men who are well behaved and orderly, from the disobedient and refractory. Mutton broth may be indiscriminately allowed to all the sick who choose it; but the strength of it should be proportioned to the state of the patient. I would advise the having three

different kinds of broth, or rather, to have broth of three different degrees of strength ; the surgeon will then direct the broth most proper for each patient. Blisters, applied to the back, may possibly be of advantage, in cases of inflammatory delirium ; but they should not be rashly or indiscriminately used : they should be looked upon by the surgeon more as a symptomatic, than a general remedy. In cases of violent or involuntary purging, the bark and antimonial medicines must either be entirely laid aside, or given along with *theriaca philonium*, or some other opiate. It is always of advantage to keep the body open, which may easily be done, by a laxative glyster, or by a dose of the purging electuary, given by itself once in twenty-four hours, or administered, in smaller quantity, with the *antimonial bolus* every six or eight hours. The drink of the sick should be marshmallow tea *, or any other

* The Spaniards were particularly fond of this.

ptisanne,

ptisanne, acidulated with the marine acid, toast and water, or lemonade, to which a few drops of the marine acid may occasionally be added. Those who dislike mutton broth, may have boiled rice for their food.

*Regulations respecting the Hospital Wards
and Bedding.*

THE hospital wards must be carefully swept every morning, and the places under the beds cleaned out with a wet mop; the floors of the wards (after being swept) must be watered, by means of a garden watering-pot, with diluted marine acid; the wards are then to be fumigated with censers of burning saltpetre, and two or three gallipots, about two-thirds filled with fuming spirit of nitre, are to be placed in the middle of each ward, to remain constantly night and day, and to be renewed every morning. The beds themselves are to

be sprinkled with vinegar, and neither the bed, nor bedding, of any patient who dies, or is discharged, is to be again used, until properly fumigated, washed, and aired. Patients who involuntarily, or negligently, soil their beds, must be laid upon palliasses, which may be easily changed every day, or more frequently, if necessary. The nurses of the hospital should be obliged to observe the strictest cleanliness; to empty the soil tubs twice a day, and even oftener, in particular cases. The tubs must be washed out, before they are again used, with diluted marine acid.

*Of the preventive Treatment, or Cure of
the Jail Fever in the first Stage.*

EVERY one who has paid the slightest attention to the history of diseases, must have remarked, that those contagions which I have distinguished by the name of *specific*, do not produce any morbid effect, nor give
any

any evidence of their being present in the system, until some considerable time after their introduction: they must also have observed, that when once received they cannot be expelled, nor the diseases which follow their introduction prevented, by any means hitherto known.

The above circumstances, together with the fact already mentioned, that a person is liable only once in his life to be affected by any *specific contagion*, constitute a very decided and marked difference between them and those I have called *putrid*. Contagions of this class, when introduced into the body, produce in general some morbid effect very early, often in twelve or twenty-four hours, and sometimes, I may say, instantaneously, or almost as soon as applied. It is also observable of *putrid contagions*, that after they have been admitted, and even after they have excited various morbid symptoms, they may be again expelled, either completely, or at least to such a degree as greatly

to lessen their virulence, and the dreadful consequences which would otherwise ensue. This observation is of the utmost consequence, as upon it is founded the first and most important part of the practice in those fevers, and what may justly be named, the preventive treatment, in as much as it prevents the fever from running through its usual course; or it may be called the cure of the first stage, as it is only in the beginning of the disease that this method of curing it is practicable. How far this first stage extends, or what is the duration of the period during which the fever may, with certainty, be removed in this summary way, I cannot pretend to ascertain; I should however imagine, that it seldom exceeds the first four and twenty hours; and that, when the contagion remains in the body beyond this time, it in general has produced morbid effects, which cannot so expeditiously be subdued.

From

From the experience of some of the ablest physicians we learn, that there are three ways of expelling the contagion; the first, by an emetic; the second, by sweating; and the third, by blisters applied to different parts of the body.

The advantage of an emetic, given in the beginning of those distempers, was first mentioned by F. Hoffman; but the superior efficacy of this remedy in the jail fever was fully ascertained by Pringle and Lind.

One practical caution is necessary in respect to emetics, viz. that they should always, if possible, be employed immediately upon the attack of the disease; that afterwards they must be used with caution, and never when the contagion has excited vomiting, or rendered the stomach extremely irritable. But, although an emetic be the chief means of expelling the contagion, it is seldom alone sufficient for that purpose, and it is therefore necessary to have recourse to sweating to complete the cure.

Sydenham

Sydenham has told us, that he often cured the pestilential fever in his time, by keeping up a perspiration for twenty-four hours; but he has neglected to inform us if this practice was applicable to those fevers in the beginning only, or if it might be employed with safety and success at any period of the disease: an omission which has been fully compensated by the experience and observations of Pringle and Lind, two authors of very great merit, especially on this subject. When sweating is employed, it should be kept up until the symptoms of fever are removed, or at least until a complete intermission is obtained; but in doing so, two cautions are necessary. In the first place, we should never force sweating by any means by which the heat of the body, or quickness of the pulse, can be greatly increased. Secondly, we ought not to persevere too long in keeping up profuse sweating, if we find that it does not afford a sensible relief, or abatement of the symptoms: by the first error, we run a
risk

risk of bringing on phrenitic delirium, with an increase of fever ; by the other, we exhaust our patient unnecessarily, when it is apparent that the disease is too much fixed to be removed in this manner.

The third method of removing contagion, is by the application of blisters. This is a discovery of Dr. Lind's, and the fact rests as yet entirely upon his authority. Not having read Dr. Lind's pamphlet on contagious fevers for some time before I went to Winchester, and not recollecting what he says of the great advantage of blisters in the beginning of such fevers, I had, judging likewise from my own experience, adopted the sentiments of Pringle and Huxham on this subject ; but I have so high an opinion of the great candor, as well as of the great experience of Dr. Lind, that, although I am still of opinion that in the more advanced stages of this disease blisters are of little efficacy and not without danger, and ought therefore
not

not to be rashly employed, I think it not improbable that in the beginning they may be used with advantage, and the discharge give an outlet to the poison ; but in whatever way we explain the fact, the authority of Dr. Lind warrants the trial, especially as it does not in the least interfere with the other means, whose efficacy is already established.

I have taken no notice of change of air, which is mentioned by Pringle as one of the means of removing contagion, as it must be a slight infection indeed, where such means can be effectual ; and surely no man in his senses would think of trusting to it, knowing that he had more efficacious and certain remedies in his power.

Besides the three methods of expelling the poison which I have just now related, there are two other circumstances which should not be omitted, and which I look upon as useful, if not necessary parts of the practice, in the first stage of this disease.

The

The first is, the opening the body, or cleansing well the *primæ viæ* : and, for this purpose, the best remedy I know is *calomel* ; as being the most certainly efficacious, and from which there is the least risk of doing too much. The second is, bathing the feet and legs, or, what is preferable, the whole body, in warm water : a practice particularly requisite for soldiers and sailors, as it washes away any remains of contagion adhering to the surface of the body, removes the coldness of the extremities, and, by relaxing the skin, renders it more transpirable, and at the same time relieves the anxiety at the præcordia. But though putting patients into warm water is attended with many advantages, it requires some caution : care must be taken that the bath be of a proper temperature, and that the sick do not remain too long in it.

When, from employing the whole, or any part of the preventive method of cure, we succeed in removing the symptoms en-

tirely, or in bringing on a complete intermission of the fever, the return of this is to be prevented by the free use of the bark ; and the health of the patient is to be restored by the usual methods, viz. by tonics, gentle exercise, change of air, &c. But, when the preventive method has proved ineffectual, either in abating or removing the disease, we may look upon the fever as now formed, or advanced to the second stage, and consequently recourse must be had to other modes of treatment.

On a subject, however, where there has been such a variety of opinions, it may not be improper, before delivering mine, briefly to enquire into those of the latest and most eminent physicians.

The

*The Opinions of different Authors, respecting
the Cure of the Jail and other contagious
Fevers.*

ALTHOUGH physicians have differed greatly respecting the particular mode to be pursued in the cure of the jail fever, they concur in opinion as to the principle upon which the cure of fevers in general is to be attempted. They acknowledge that this is to be looked for not so much from art as from nature ; that is, from the efforts of the constitution, or those motions excited in the living principle, which, though sometimes destructive, are evidently intended for the preservation of animal life. That the business of the physician is to regulate those efforts, to prevent them from being too active or violent, on the one hand, or too remiss and oppressed, on the

the

the other ; and to obviate the dangerous or troublesome symptoms which usually occur in the course of the disease. Such has been the general intention, or what is commonly called, indication of cure in all continued fevers, from the age of Hippocrates to the present time. How far physicians have adhered to this principle, in their treatment of contagious or malignant fevers, I shall now examine ; beginning with Sir J. Pringle, an author of considerable merit, especially on this subject, and whose practice does not greatly differ from that of Huxham and Lind, physicians who also stand high in the public esteem, whose writings are in the hands of every practitioner, and whose mode of treatment has been very generally adopted in this country.

Although the jail fever has no regular periods, Pringle has divided it into three stages. Of the first, which seldom extends beyond twelve or twenty-four hours, I have already spoken ; the second continues

tinues until the pulse sinks ; the third commences when both pulse and strength fail ; at which time the patient most commonly is affected by coma or delirium. As the efforts of the constitution, in the beginning of continued fevers, have in many instances been found too violent, and in danger of bringing on local inflammations, bleeding has been a very general practice ; it has been recommended by Pringle * and by Huxham †, in the jail fever, and by many, even in the real pestilence. This practice, from whatever authority it comes, I must condemn, as highly injudicious, hazardous, and often fatal : nothing surely can be more absurd than to use any means

* In the second state, when the fever is manifest, with a quick and full pulse, it will be proper to bleed, if not done before. Vid. Pringle, p. 315.

† Though malignant and pestilential fevers, at the very onset, greatly sink the spirits, and cause surprising and sudden weakness, especially when from contagion, yet bleeding, to some degree, is most commonly requisite. Vid. Huxham's Essays on Fevers, p. 104.

to diminish the strength of the body, when we are certain that, sooner or later, the strength will fail and require being supported; and when, though the pulse may not be very sensibly sunk, there are the most evident signs of debility and dejection. It is true that here, as in every other fever, local inflammations sometimes happen, but can those * inflammations be prevented, or are they to be cured by bleeding? Does any physician of this country now think of having recourse to the lancet, to cure the inflammation of the fauces in the scarlet fever, or what is called the putrid sore throat? Are there not likewise many instances of erisipetulous and membranous inflammation, where bleeding is pernicious or fatal †? But I leave the reader to form

* The word inflammation, comprehending diseases of very different natures and terminations, has been a source of great mistakes in the practice of physic.

† Vid. an Essay on Inflammations, in the 2d volume of the Medical Communications.

a judgment of this practice, from what those gentlemen themselves have written on the subject.

Sir John Pringle observes, that “ in
 “ inflammatory fevers, bleeding constantly
 “ moderates all the symptoms, but in this
 “ (the jail fever) it seldom has that effect.
 “ The first bleeding, if moderate, little af-
 “ fects the pulse ; but if the evacuation be
 “ large, and especially if repeated, (to answer
 “ a false indication of inflammation) the
 “ pulse increasing in frequency is apt to sink
 “ in force, and often irrecoverably, whilst
 “ the patient becomes delirious : and even
 “ in every case, independent of evacuations,
 “ the pulse sooner or later sinks *. Many
 “ have recovered without bleeding, but few
 “ who have lost much blood †.”

Let us next hear Huxham on this sub-
 ject. “ Contagion certainly weakens the

* Vid. Pringle on Diseases of the Army, 8vo. edit.
 p. 298.

† Id. p. 315.

“ force of the solids, and tends to dissolve
 “ the blood ; so that when we have a sus-
 “ picion that a fever arises from contagion,
 “ we should proceed with caution in letting
 “ blood, even though the symptoms may run
 “ pretty high at the beginning, and seem to
 “ demand the taking of a pretty large quan-
 “ tity, &c. and therefore, though the first
 “ bleeding may be proper, the subsequent
 “ may not be so ; nay, pernicious *. The
 “ pulse in these cases sinks oftentimes sur-
 “ prisingly after a second bleeding, nay
 “ sometimes after *the first*. And this I have
 “ more than once noted, to my great asto-
 “ nishment, and that even where I thought
 “ I had sufficient indications from the pulse,
 “ &c. to draw blood a second time †. The
 “ first blood frequently appears florid ; what
 “ is drawn twenty-four hours after, is com-
 “ monly livid, black, and too thin ; a third
 “ quantity livid, dissolved, and sanious ‡.”

* Huxham on Fevers, 3d edit. p. 108, 109.

† Ibid. p. 109.

‡ Ibid.

Unless we had the evidence of Dr. Huxham himself on this subject, we should scarcely have believed it possible that he could have ordered repeated bleeding under such circumstances ; but so difficult is it, even for the strongest minds to get rid of early prejudices, though their own experience shews the falsehood of them every day. The truth is, that the pulse, from which those gentlemen took their indication of bleeding, is always irregular, and never to be depended upon in this fever ; that from the smallest quantity of blood taken away, the strength often sinks irrecoverably, and that bleeding, even supposing it to do no mischief, is not effectual, either in preventing or in curing the phrenitic delirium, and other symptoms of local inflammation, which sometimes occur. I may also add, that the greater number of instances of phrenitic delirium which I have met with, either in this fever, or in the putrid sore throat, were evidently the consequence of

improper treatment in the beginning ; and therefore must protest, so far as my feeble voice can go, against the use of the lancet in the jail or hospital fever, and indeed in every other, when accompanied by what are called malignant symptoms, which are caused by the higher degrees of putrid contagion.

After bleeding, both Pringle and Huxham recommend cleansing the primæ viæ, by a vomit and gentle purge. I have already mentioned the great benefit to be derived from an emetic, given upon the attack of the disease ; but when the fever has continued beyond what I, after Pringle, call the first stage, the use of an emetic is then more equivocal, especially if the stomach, as is often the case, has become so extremely irritable as to reject every thing taken in ; but if, along with this great irritability, there is a sense of burning heat and pain at the præcordia, with or without hiccough, and still more, if with these symptoms there is an aphthous appearance in the mouth, no
 physician

physician in his senses would think of administering an emetic, or of irritating the stomach, even with camomile tea *. A saline draught in the act of effervescence, absorbents, mucilages, and opiates, are at this time the chief medicines to be employed.

In respect to purging, I shall only observe that, as the keeping the body gently open is a useful practice in every fever, it is particularly so in this, where the great oppression at the region of the stomach must be considerably aggravated from spasms, or flatulency in the bowels. At the same time I have always remarked, that the sick in this fever do not bear purging any more than bleeding; I have seen patients sink even from the operation of a glyster †.

* The medicine ordered by Pringle.

† I have sometimes observed persons in low fevers more sunk from the evacuation caused by a glyster, than from two or three stools in consequence of any medicine taken by the mouth. What the reason of this may be, I will not pretend to say; but of the fact I am certain, and therefore I never order purging glysters in those fevers, except in the beginning.

After clearing the first passages, Sir John Pringle confined his practice in the second stage to promoting a diaphoresis, by the mildest medicines of the sudorific class. His own words are : “ The next care is to
 “ promote a *diaphoresis*, which in this state
 “ of the fever is to be attempted only by
 “ the milder sudorifics, and for this purpose the spiritus mindereri has been
 “ used *.”

His observations respecting sweating have always appeared to me extremely judicious, and have been confirmed by the concurring testimony of the ablest physicians, in all ages and countries.

Again †, “ As soon, therefore, as the
 “ distemper is confirmed, I give such
 “ medicines only as were recommended
 “ before in the cure of inflammatory fevers ; viz. the contrayerva powders, with
 “ nitre and camphire, and the common
 “ ptisan acidulated with vinegar.”

* Vid. page 317.

† Vid. p. 318.

It must strike every one who reads this, as a strange inconsistency, that the same medicine should be employed in two fevers so directly opposite to each other; for we surely have reason to suppose, that a medicine which is of service in an inflammatory fever must be hurtful in a jail fever, where the indications of cure are so extremely different; but Sir John Pringle has in some measure explained this apparent contradiction, by telling us that he never saw any effect from the medicine, and therefore it might suit one fever as well as another. He says; “ upon the whole, it “ was a medicine which had little sensible “ effect, and therefore I laid the less stress “ upon it.” To be sure, when we consider what the medicine was, we must be satisfied that its effects could not be great: it consisted of ten grains of nitre, seventeen of an absorbent powder, three of camphire, and about three of contrayerva. The last article appears to me
to

to be very ill suited to an inflammatory fever, and in too small a quantity to be useful in a putrid one; whereas nitre*, which is found useful in inflammations, if in so small a dose it could have any effect, appears an improper remedy for the jaund distemper.

Sir John Pringle was himself so much aware of this, that in the third stage of the disease, or when the pulse sunk, with petechiæ, delirium, or coma, he omitted the nitre, and introduced powder of snake-root; or, instead of the powder, gave a decoction of the snake-root alone: and at last, as the highest improvement of his

* The practice of giving nitre with camphire in contagious fevers seems to have prevailed very generally, but whether physicians have been led into this practice from any particular reasoning on the qualities of the medicines, or from their experience of the utility of such a combination, I cannot take upon me to say; but, judging from the general effects of nitre, it appears to me an ill chosen medicine for such a disease.

practice,

practice, and the final result of his experience, he gave a decoction of bark with snake-root; though even with this medicine, he tells us, that he lost one in ten, when the disease was mild, and the places where the sick lay were well aired; and that where the disease was more violent, he lost one in five. A degree of success, which does not greatly encourage us to adopt his method of cure. Besides the decoction of snake-root and bark, Sir John Pringle gave occasionally a cordial mixture, made of the *confectio aromatica* and volatile alkali. He also gave wine, the praises of which in this fever, he justly celebrates.—
 “ So great,” says he, “ is the virtue of
 “ wine in this stage of the fever, that I
 “ have known many recover from the
 “ lowest condition, when, refusing the de-
 “ coction on account of its taste, they took
 “ nothing but a little panada with wine,
 “ and the volatile mixture, every two or
 “ three hours by turns.”

What

What he afterwards subjoins, respecting the necessity of the patient taking frequently some nourishment or support, and what he repeats, after Hoffman, of the danger of an erect posture, are the observations of a judicious practitioner, and apply to every case of extreme weakness, and more especially to that which occurs in putrid fevers of all kinds.

Sir John Pringle's symptomatic treatment regards principally the phrenitic delirium and diarrhoea: for the first, he advises leeches to be applied to the temples, though he does not say that he has ever seen them of service; and a blister to be put upon the back, although, unless for this particular symptom, he has no opinion of the utility of blisters. For the diarrhoea, he prescribes what is commonly used, the chalk mixture with laudanum, recommending to check this symptom only, not to stop it entirely. In cases of phrenitic delirium, he omitted wine, and the decoction

coction of bark with snake-root, and had again recourse to the contrayerva powders with nitre. His remarks on convalescents have nothing new in them, excepting the singularity of his belief, that patients might recover after a portion of the substance of the brain had suppurated.

Dr. Huxham's practice in this fever differs but little from Sir John Pringle's. Besides keeping the body open, he advises purging the patient gently, on the eighth or ninth day of the disease; he employs not only the vegetable but also the mineral acids; and rejects entirely the use of volatile alkali and blisters, unless where their stimulus is required. His principal medicines to promote a diaphoresis are, camphire with vinegar, and sometimes with opium, as in the paregoric elixir; or theriaca. In the last stage of the disease, he gave the Peruvian bark, especially that tincture of it which long went by his name, joined with elixir of vitriol. He recommends
strongly

strongly the use of wine, particularly port wine, with lemon or orange juice.

Dr. Lind, physician to Haflar hospital, whose excellent observations on contagious fevers justly entitle him, had he done nothing else, to the gratitude of posterity, enforces, in the strongest terms, the preventive practice, or method of removing this fever in the beginning, by an emetic and subsequent sweating; the vomit he employed was a very gentle one, from six to ten grains of the powder of ipecacuanha; to excite perspiration, he prescribes five grains of the salt of hartshorn, united with fifteen or twenty drops of laudanum, or with five grains of camphire, every four hours; drinking large draughts of vinegar whey. But what chiefly distinguishes Dr. Lind's practice, is the use he makes of blisters, and the success or advantage which he found in this fever from their early application. It may be proper to quote his own words. "Where the proof
" of infection is evident, (after premising a
" vomit,

“ vomit, &c.) recourse must speedily be
 “ had to blisters ; these are to be applied
 “ to the back, if the head or limbs are af-
 “ fected, and to the breast, should the pain
 “ have seized that part. I do not know a
 “ surer mark of a prevailing infectious
 “ fever, than that, of twenty patients to
 “ whom it has been communicated, and
 “ who were blistered at night, sixteen will
 “ next morning be entirely free from heat,
 “ headach, pain, and fever *.”

In respect to bleeding, Dr. Lind is of my
 opinion. “ This operation (viz. bleeding)
 “ is always dangerous, in proportion to the
 “ virulence of the taint; fevers highly
 “ malignant will not bear bleeding †.”

After some general reflections on the
 use of antimonial medicines in fevers,
 he says, “ Antimonials should be exhi-
 “ bited in small doses, frequently repeated.
 “ I often add four or five grains of cam-

* Vid. Lind on Fevers and Infections, p. 68.

† P. 70.

“ phire

“ phire to each dose, at other times nitre
 “ in like quantity. When antimony
 “ ruffles or purges, it should be admi-
 “ nistered in boluses of confect. cardiaca,
 “ electar. e scordio, or even philon. lond.
 “ and in cases of great lowness, with the
 “ addition of five grains of sal corn. cervi.”

He also recommends in low fevers, an infusion of contrayerva and snake-root, with some camphire, or distilled vinegar, and sometimes rhenish wine.

Amongst the eminent physicians of the present century, may be reckoned Boerhaave, Van Swieten, and Fred. Hoffman. Of the two first, it may be said with truth, that they had no knowledge of the disease in question. Boerhaave makes no mention of this particular fever, and what Van Swieten has written on the subject of epidemics and exanthemata, particularly respecting petechiæ, shews that he was as ignorant as Sydenham of the nature of this symptom. As for Fred. Hoffman, one of the first practical

6

physicians

physicians that this or any age has produced; he not only describes the disease * with accuracy, but his method of treating it deserves our particular notice. From him we learn the practice, so successfully followed by Pringle and Lind, of curing the fever in the beginning by an emetic and sweating †. The vomit he employed was two grains of tartar emetic in an ounce of elderflower water, and as much of that of *carduus benedictus*. To promote sweating, he gave calcined hartshorn, diaphoretic antimony, nitre, camphire, &c. He either rejects bleeding entirely, or is extremely cautious in using the lancet. He censures the use of heating cordials, or what are called alexipharmics, in the beginning of the disease; recommends the diaphoretic antimony, with absorbents, nitre, and camphire, for promoting a diaphoresis: but he seems to have

* Vid. Hist. feb. petech. in princip. Mund. grassantis. p. 88.

† Vid. Tom. ii. p. 92. Observ. vii.

placed his chief reliance on gentle purges, and on the liberal use of acids, not only the vegetable, but also those of the mineral kingdom ; and likewise on the free use of wine, particularly of rhenish wine.

Amongst the physicians of the last century, our countryman Willis has described this disease very accurately, and has also related a striking instance of it which, in the year 1643, appeared both in the king's as well as in the parliament's army at Reading. His method of curing this fever, consisted in the judicious employment of evacuations, and of alexipharmics ; the first, as he justly observes, lessens the fever, but increases the effects of the poison ; the other, by sweating, expels the poison, but is apt to increase the fever. In describing the fever at Reading, he says, “ *Durante*
 “ *canicula hic morbus usque infestus, non uti*
 “ *febris, sed velut mitior pestis tractari, &*
 “ *remediis tantum alexipharmacis expugnari*
 “ *cæpit, phlebotomia huic usque fatalis cre-*
 6 “ *dita*

“ *dita est: vomitoria & purgationes inter-*
 “ *dum, licet non ita crebræ, usui fuerunt; po-*
 “ *tissima autem medendi ratio in alexiteriis, &*
 “ *diaphoresi tempestive procuranda, statue-*
 “ *batur*.*”

In the writings of Sydenham there is not, properly speaking, any account of a jail fever; unless we consider the pestilential fever, which prevailed in London after the plague, as a disease of the same kind: this Sydenham cured either by immoderate bleeding, or by exciting, after a moderate bleeding, profuse sweating for twenty-four hours. The bleeding patients *ad deliquium animi*, a practice which he strongly recommends in this disease, with the various instances of success which he adduces, and the authorities he quotes in support of this method of cure, as much surpass my comprehension, as they do my belief; this treatment is so contrary to our opinion

* Vid. Willis de febrib. cap. xiv. p. 114.

of the disease, and to the experience of the most distinguished physicians, for nearly three hundred years. But, be the observations of Sydenham true or false, I imagine few practitioners will be found of sufficient hardiness to imitate his example.

Upon the continent of Europe, there were many physicians of great eminence and professional merit, both in the sixteenth and seventeenth centuries, who have written on this subject, whose observations throw great light on the nature of the disease, and from whose practice much may be learned. The principal of these are Fracastorius, Forestus, Riverius, Mercatus, Zacutus Lusitanus, Mindererus, &c. But I do not intend to encroach farther on the patience of the reader by examining their practice in detail; for the generality of persons I have perhaps already entered too minutely into this enquiry; for others, who wish on this, as on every subject, to form an opinion for themselves, they will probably

probably examine the authors I have quoted, and I can venture to assure them, that they will be very well rewarded for their trouble. They will find many useful and necessary cautions respecting the too liberal and indiscriminate use of the lancet; they will observe that those physicians in general preferred taking away blood by cupping or by leeches; that they recommend the use of the gentlest purges, such as tamarinds, manna, syrup of roses, &c.; that they are always afraid of diminishing the strength of the patient, at the same time are sensible of the danger of heating the body by the improper use of cordials, &c.; they agree in the utility of wine, but are aware that, improperly administered, it may, like other cordials, be prejudicial. They concur in praising acids, especially those of the vegetable kingdom, as vinegar, lemon, and orange juice, sorrel, &c. and they likewise often employ the vitriolic acid. Their principal alexipharmics are vegetable

acids, astringents, aromatics, absorbent powders, boles, &c. &c.; some recommend contrayerva, all of them camphire and nitre. In their writings, are likewise to be found many useful observations on the various means of obviating or palliating symptoms, by epithegms, embrocations, frictions, ointments, plaisters, &c. and upon the advantage of cold drink; and the cautions necessary to be attended to in indulging the sick in its use. But, for those who wish to know more of the opinions and practice of the physicians of those ages and countries, I must refer them to the authors above mentioned, and shall proceed to describe the method of treating this fever, which, upon the whole, I have found most successful, and have therefore adopted for many years past.

Of

*Of the Treatment or Cure of the Jail Fever
in the Second Stage, or when the Disease is
established.*

THAT the mischief arising from a contagion or poison introduced into the habit, can only be remedied by expelling the poison, or by counteracting its effects, is a self evident proposition. I have already shewn how putrid contagion may, in the beginning, or at an early period of the disease, be quickly expelled. We learn also from experience, that when it has remained beyond that time, and produced certain effects on the body, its removal or expulsion, in this expeditious manner, becomes impracticable, and is therefore no longer to be attempted; the business is now in the hands of nature, and must chiefly be entrusted to the natural powers of the constitution, whose inefficacy indeed we have too frequent cause to lament: at best we are exposed, during the

conflict or course of the fever, to a variety of accidents, which often disappoint our hopes, and sometimes at the moment when we think ourselves most certain of success.

I have already explained how putrid contagion is to be expelled in the beginning by exciting vomiting, and sweating; I have only now to add, that for the first intention I prefer tartar emetic to every other medicine of the kind, both from its acting more powerfully, and from its superior efficacy in bringing on an intermission or remission of fever. I generally, to an adult, give, at first, two grains dissolved in distilled water, afterwards one grain every quarter of an hour, until it produces a proper effect. When its operation is over, I order some gently laxative medicine, unless the tartar emetic solution, as is often the case, has rendered this attention unnecessary. Before the patient is put to bed, he should bathe his feet in warm water, to which a little vinegar may be added; or, if there is

con-

conveniency for it, go into a *semicupium*, or tepid bath, for ten or twenty minutes. To bring on a perspiration, which, after vomiting, is the most important part of the prophylactic practice, I know no medicine so effectual as an antimonial powder, in a proper dose, with twenty or thirty grains of theriaca or mithridate *, to which I commonly add three or four grains of calomel; not that this has any power to occasion sweating, but it clears the bowels more completely than any other medicine, dislodges hardened scybala, or worms, and more certainly procures a complete intermission of fever. To promote the tendency to sweating, some white wine whey, or sage tea, acidulated with a small quantity of vinegar, may be taken about an hour after the preceding medicine, unless where it has caused sickness, when no liquid should be given.

* The *Confectio opiata* is now substituted by the College, instead of these compositions.

The

The perspiration, once excited, must be kept up by tepid drinks, and by a repetition of the antimonial powder, if necessary, until a complete intermission of the fever is obtained; the bark is then to be administered freely, and any remaining symptoms of indisposition are to be removed by blisters, change of air, (especially the sea air, or that of mountains,) warm aromatic purges, such as the tinctures of rhubarb, aloes, &c. taken from time to time, and occasionally an emetic, when the tongue remains white, with a bad taste in the mouth, loss of appetite, and restless nights. But the management of this disease, in the beginning, does not present those difficulties to the physician which occur in the second stage, or when the fever is fixed and established. In respect to the proper treatment of the fever at this period, I have already examined the opinions of many eminent physicians, especially with regard to bleeding; which, in opposition to men of
 very

very high authority, I have ventured to declare not only hazardous, but perfectly inadequate to the purposes for which it has been recommended, as the inflammations that occur in this disease are either erysipelatous or membranous ; at any rate they are not of a kind to be prevented or cured by the lancet*.

I have also expressed my sentiments respecting another evacuation, almost as hazardous as bleeding, viz. purging. I am ready to allow, that this may be employed with very great advantage in the bilious remittent, and in putrid fevers ; but I affirm, that the practice is injudicious and improper in the jail fever ; I have seen it followed by involuntary and colliquative stools, and have great reason to suppose, from what I have more than once observed on dissection,

* I have delivered my opinion still more fully on this subject, in a paper on the distinctions of inflammations, published in the 2d volume of the medical communications.

that

that it sometimes brings on gangrene of the intestines.

I have already also taken notice of the advantage derived from sweating in the incipient state of this disease, but have said that, even then, it should be conducted with caution, and not persevered in, unless followed with an evident abatement of the symptoms. I have farther to observe, that when this first period is over, profuse sweating should never be attempted; for if it does not cure, it weakens the patient; and the means commonly employed to procure or promote sweating, necessarily aggravate the symptoms of fever, and probably induce phrenitic delirium, as I have several times remarked.

Upon the whole, there is perhaps no situation in the practice of physic, where the maxim of "*ne quid nimis*," should be more religiously observed than in the present. But although purging and profuse sweating are both highly improper in the confirmed
state

state of the jail fever, the keeping the body open and the skin moist, where this can easily be done, is at all times highly useful. The great objects, however, of the rational physician, at this period of the disease, are, to moderate the symptoms of fever without diminishing the strength, and to support the strength without increasing the heat of the body or frequency of the pulse; and to answer those complicated and seemingly opposite intentions, I do not know any medicines so proper as some of the preparations of antimony, and the spiritus ætheris vitriolici, or the vitriolic æther itself.

It is not my intention here to enter into the singular and whimsical history of antimony, employed as a medicine, nor to examine the comparative merit of its various preparations; it is sufficient for my purpose, that the efficacy of tartar emetic, and of the celebrated James's powder, in the cure of fevers, is now established upon as firm a basis of experience, and of public opinion,

opinion, as that of the peruvian bark itself; and those gentlemen who have the most extensive practice in warm climates must acknowledge, that they would frequently be disappointed in curing the fevers which prevail there by the bark, were it not for the remission first obtained by the judicious use of tartar emetic. It is not, however, with the intention of exciting vomiting that I would give tartar emetic, or any antimonial medicine, at this stage of the disease; not but that even then it may sometimes be usefully given in nauseating doses; but, in general, unless when there is some particular reason for so doing, it is not necessary to excite nausea; and it is perhaps more prudent to avoid it, as it may terminate in vomiting, and increase the irritability of the stomach, a symptom always troublesome, and sometimes dangerous. I have seldom therefore given tartar emetic alone, commonly with the unwashed calx of antimony, &c. according to the form in the Appendix*: I have

* Vid. Formulæ Medicam.

also occasionally and indiscriminately used James's powder, or the pulvis antimonialis of our dispensatory ; there is some difference required in the dose, according to the preparation employed, but I have not yet discovered any other material distinction amongst them.

The great uncertainty in the operation of antimonial medicines has always been, and still is, a reasonable objection to their use ; they are apt to do either too little or too much ; upon that account, therefore, unless in the beginning of the jail fever, we dare not venture to give any antimonial medicine in a full dose, and in a small one we are liable to be disappointed of the desired effect. To determine their operation to the bowels in a moderate way, and to do this without risk, I generally, to the antimonial powder, add a few grains of rhubarb or of calomel ; when I want merely to procure an evacuation, I use rhubarb, but, where the bowels are foul, or where there
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are symptoms of visceral inflammation, I prefer calomel, giving it once or twice in twenty-four hours. The antimonial powder, thus managed, commonly answers extremely well; it keeps the body soluble, the skin moist, prevents the dryness of the mouth and fauces, and lessens the oppression, anxiety, and sense of heat at the præcordia: if it purges too much, it requires to be corrected by absorbents, aromatics, and opiates; and if these should not answer the purpose, we must lessen the dose of the medicine, or give a less active preparation. And if, notwithstanding these precautions, the antimonial medicine should continue to run off by stool, we must desist entirely from its use. There are two other cases also in which antimonial medicines are improper, either when, from the extreme irritability of the stomach, they occasion sickness and vomiting, or when there is a disposition to profuse sweating. There is a third case also, where

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am doubtful of the propriety of employing them; viz. when they increase lowness and dejection, as I have sometimes observed in women. This, however, is greatly obviated by the spiritus ætheris vitriolici, the other medicine, which, from a long experience of its efficacy, I have ventured to recommend in the cure of contagious fevers.

This medicine has an advantage over most cordials, as it does not increase the heat of the body, or the quickness of the pulse, but, on the contrary, renders the action of the heart more regular and slow. It is also serviceable in promoting a diaphoresis, and in lessening the anxiety, tremors, &c.; but as I have, in the Appendix, reprinted the account I formerly published of this medicine, I shall say nothing more on the subject at present, except to mention the different ways in which I have usually given it.

In cases of fever, accompanied with petechiæ or vibices, and with a disposition to hemorrhage, I commonly give it in the infusum rosæ, two or three drachms to the pint. When there is great heat at the region of the stomach, I prefer giving it in a glass of Seltzer water, either simply, or with a tea spoonful of lemon juice, which makes an effervescent saline draught. Where the stomach is extremely irritable, I give it in an infusion of mint, or of borage, and often in weak negus, made with hock or rhenish wine. Sometimes I give it more largely diluted, as a beverage; at other times as a medicine, with a smaller proportion of water. In some cases, instead of the spiritus ætheris vitriolici, I give the vitriolic æther itself; the former, however, is more conveniently administered, and therefore commonly to be preferred. But, altho' I have found the vitriolic æther and the compositions of it generally agreeable to the taste of the sick, I have now
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and then met with persons who had a particular dislike to it, and could not take it in any form : in those cases, I use camphire in its stead, giving the camphire mixture either alone, or with the aqua ammoniæ acetatæ, by which I think its diaphoretic power is increased.

The use of camphire in contagious fevers, and in the plague itself, is almost established by prescription. It certainly often proves a cordial to women. I have seen it likewise disagree with the stomach, particularly when given in substance ; but whether it has any particular power to abate or expel contagion, to remove fever, or to resist the tendency to gangrene, is as yet, I think, extremely doubtful. Excepting the medicines already mentioned, I have seldom been under the necessity of employing any other in the second stage of this disease ; and, where the fever has been treated in the manner recommended above, the third stage has seldom

occurred ; at the same time, as we may be called to persons in the third stage, in which another mode of treatment becomes necessary, I shall now enquire what are the medicines most proper at this period of the disease.

When the patient is under a permanent coma or low delirium, with an increased propensity to gangrene and a resolved state of the blood, (symptoms characteristic of this last stage) recourse is commonly had to the peruvian bark, serpentaria, contrayerva, aromatics, volatile alkali, musk, mineral acids, and wine, with the application of blisters to the extremities.—The peruvian bark is strongly recommended by Pringle and Huxham, at this period of the fever ; and, certainly, from the experience we have of the bark in gangrenes, and in all cases of debility, it is the medicine that promises to be of the greatest advantage. The only objection that at this time can be made to its use, supposing the stomach
capable

capable of retaining it, is, that if given in small quantity, it is opposing a trifling remedy to a violent disease, if in larger doses, it is apt to increase the dryness of the mouth and difficulty of swallowing, and often to such a degree as to prevent our continuing the use of the remedy. It is from this consideration that, wherever the bark is necessary, I never trust to the quantity given by the mouth, but also order it to be thrown up by glyster every twelve hours; and, to support the strength, I commonly direct the bark to be boiled in mutton or chicken broth: of this, half a pint or twelve ounces may be administered at a time, to which it is generally adviseable to add twenty or thirty drops of the *tinctura opii*. I do not suppose that the bark, thrown up by glyster, would answer equally well as when taken by the mouth, in preventing the paroxysm of an intermittent, or the accession of a remittent fever; but,

in the last stage of putrid or malignant fevers, where the dryness of the mouth and fauces, and the difficulty of swallowing, frequently prevent the sick from taking bark, in the quantity necessary to produce any permanent effect, glysters of it are frequently of the greatest service, particularly when given in the manner now described, as they answer the double purpose of medicine and of nourishment. But the use of the bark has not been wholly confined to the last stage of this fever; it has been often given in the very beginning, and there are many physicians who look upon it as the principal medicine to be employed in this, and in every fever of the putrid class, and at every stage of the disease.

It has been a common error in the practice of physic, whenever any medicine was found of extensive utility, to suppose it universally so; it saves the trouble of discriminating, supercedes the necessity of experience,

experience, and puts knowledge and ignorance on a level. Tar water, lime water, James's powder, peruvian bark, have each in their turn, within this last century, been considered as panaceas, or medicines of universal application, and equal to the cure of all diseases ; but the folly of the day, or the caprice of individuals is of short duration, and medicines, like men, at last take their level, and come to be estimated according to their real value.

Bark is, without doubt, a medicine of very extensive utility, and yet the indiscriminate use of it is attended not only with inconvenience, but with danger ; in many cases of erysipelas, in the first stage of the scarlatina anginosa or ulcerated sore throat, and in the beginning of contagious fevers, I have seen the bark given, and have myself repeatedly given it, both in small and in large doses ; the first had little sensible effect, the latter evidently aggravated all the symptoms ; the heat of

the body, thirst, dryness of the skin mouth and fauces, quickness of the pulse, restlessness, anxiety, and watchfulness constantly increasing, and in proportion to the quantity of bark given. I have likewise seen all those symptoms subside upon leaving off the bark, and adopting a different mode of cure. To conclude ; after an experience of six and twenty years, I am not more convinced of opium relieving pain, or of mercury being a remedy for the venereal virus, than of the impropriety and bad effect of giving bark in the beginning, or in the early stages, of the diseases above mentioned. I am also fully persuaded, that in the latter periods of those diseases, when bark is not only useful but necessary, it is of great advantage to give it in the form of glyster, and in the manner already described ; a smaller quantity is then required to be taken into the stomach, consequently there is a greater chance of its being retained, and of avoiding the dryness of the mouth and fauces.

As

With respect to the serpentaria and contrayerva roots, which of late years have been so frequently employed in contagious fevers, as I have generally given them, or seen them given, with the bark, I have not been able to ascertain whether, of themselves, they have any sensible effect. They are aromatic bitters and tonics, and as such may be useful ; but as they are in general nauseous to the patient, and, when joined with the bark, render its taste more disagreeable, I have of late years entirely laid them aside.

Volatile alkali, and musk, may possibly be of service to abate symptoms, but I do not suppose, and indeed have never observed, that they have any permanent effect in fevers. The case is different with the mineral acids, the antiseptic power of which has been often noticed : when largely diluted, they are useful in the early stage of putrid fevers, by quenching thirst, and lessening the heat of the body ; but their most
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remarkable effect is, checking the tendency to extravasation and hemorrhage; and, in the last stage of those fevers, joined with the bark, they seem to increase the power of that medicine, in resisting the disposition to gangrene.

As for wine, it has been universally recommended in contagious fevers, and, unless where the sick themselves have a dislike to it, which is sometimes the case, or when there is reason to apprehend a phrenitic delirium coming on, it may safely be allowed in every stage of the disease. The quality of the wine, and the quantity of water with which it is diluted, will depend upon the time and symptoms of the disease. In the last stage, when the patient is extremely weak, with a sunk pulse, and cold sweats, the strongest wine is required; and the proper quantity can only be determined, by the effect it produces. I have given, with advantage, two bottles of madeira a day, for several days together,

together, and I once gave two bottles of port wine in twelve or fourteen hours, to a patient who recovered.

I have already mentioned, from Dr. Lind, the utility of blisters, in the first stage of contagious fevers, or in the slighter degrees of infection. I cannot say that, at a more advanced period of this disease, I have observed much advantage from their application; in the last stage, when they are commonly applied as stimuli to the legs and arms, I have never seen them of the smallest utility, and I think there is a considerable risk of their bringing on mortification. Where a stimulus of this kind is required, I prefer the application of sinapisms or mustard poultices, to the feet; but even those, if suffered to remain too long, sometimes occasion inflammation and painful ulceration of the part, which, in all such cases, we should carefully avoid.

Before I conclude this subject, it may be necessary to add a few words concerning
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the regimen and management of the sick, as their recovery is greatly promoted by proper attention to these circumstances.

I have said, that they should be kept in bed, and in a horizontal posture ; their beds ought to have no curtains, or at least the curtains should not be drawn about the bed, so as to prevent the free circulation of air ; the heat of the room should be temperate, rather cold than hot ; the windows, unless in very severe weather, kept open during the day ; the quantity of bed clothes must be regulated by the state of the patient, and his habits of life ; in general, the sick should be lightly covered. Liquid nourishment is, in general, the only food they require, and as they commonly dislike broths, we are confined to the use of gruels, panadas, and vegetable jellies, to which wine occasionally may be added ; but whatever they take should be given in small quantities, and often. Their drink should never be more than tepid, and, when
there

there is no symptom of visceral or internal inflammation, quite cold. In many cases, I have no objection to ice, or to drink cooled in ice. They should not, however, drink much at a time ; and, as they have seldom great thirst, they do not require it. Fruit is commonly agreeable and useful to them.

Treatment of particular Symptoms.

DURING the course of most fevers, there are symptoms occur which greatly increase the sufferings and danger of the patient, and, as they require a specific or local treatment, demand a particular attention on the part of the physician. In the present fever, the symptoms that most immediately claim our notice are, great irritability of the stomach itself ; burning heat and oppression at the region of that viscus ; anxiety, lowness, palpitation, and tremors ; headach, and phrenitic delirium ; symptoms of inflammation affecting other parts of the body ; profuse sweating ; purging ; hemorrhages, and gangrene.

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The stomach, which is always more or less affected in contagious fevers, is often, in the beginning so extremely irritable as to reject every thing taken into it. This is always a troublesome and very alarming symptom, as it commonly, I believe, arises from inflammation of the peritoneal or villous coats of the stomach itself, or of some of the neighbouring viscera. In this distressing case, I have known some relief afforded by fomentations, or by a plaster of theriaca, or of opium and camphire, applied to the præcordia; internally, absorbents, mucilages, and opium, are the chief remedies. But, the medicine which I have found the most useful is calomel, given in pills, to the quantity of one, two, or three grains, with opium, and repeated at intervals until it procured some evacuation by stool.

For allaying the burning heat and oppression at the præcordia, I know nothing so serviceable as twenty or thirty drops of vitriolic æther in a glass of Seltzer water,
neutral-

neutralized with a tea spoonful of lemon juice, and taken in the state of effervescence. The vitriolic æther, or spiritus ætheris vitriolici, is also the best cordial and most effectual remedy, for the lowness, anxiety, tremors, and catchings, which so frequently occur.

The most effectual means of obviating the phrenitic delirium, a symptom so much to be apprehended, and which in general proves so fatal, is to keep the body open, the air of the room cool, the patient lightly covered, and to avoid bark and all heating cordials. When the delirium had come on, I never observed any sensible relief from the application of leeches, or of blisters; but I have repeatedly seen a patient greatly composed by cold embrocations constantly applied to the forehead, or to the head shaved, and also by fomenting the legs with warm fomentations. The embrocation I commonly used is rose water, with a small proportion of vinegar, and of camphorated spirit of wine.

Symptoms

Symptoms of pneumonic inflammation are only, I imagine, to be remedied by fomentations, cupping, or blistering, but, as I have seldom met with such symptoms, I can say little on the subject, from my own experience. Where there is a tendency to profuse sweating, the patient should sleep on a mattrafs, be kept extremely cool, and take frequently a cup of the infusum rosæ. Antimonials, in this case, I have already said were improper; if the mouth and fauces are not dry, the bark may be given; at any rate, it should be administered by glysters. The drink should be red wine and water, cold, with a few drops of the elixir of vitriol.

Too great a tendency to purging requires also a particular attention; absorbents, mucilages, and opiates, with ipecacuanha or rhubarb in small doses, are the proper medicines to remedy it; antimonials, and acids, whether vegetable or mineral, must be avoided.

Of

*Of the convalescent State, and of the general
Effect of contagious Fevers on the Con-
stitution.*

CONTAGIOUS fevers, especially when they arise from a jail contagion, seldom terminate in complete recovery, and it is commonly a long time before those who have escaped the first and more immediate danger, are restored to their former health and strength ; they in general remain languid, their appetite impaired, and their sleep unrefreshing ; they are giddy and faint, upon attempting to walk, or even from an erect posture ; their pulse continues extremely quick, sometimes even quicker than during the fever ; their sight is frequently impaired, and the pupils of the eyes greatly dilated, with a puffy redness of the eye-lids, particularly in the morning ; their legs are apt to swell towards night ; and they have

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generally

generally a preternatural heat and dryness in the palms of their hands; sometimes they become suddenly dropfical or anasarcaous, and I have known instances where, with the symptoms of water in the chest, or pericardium, they have died suddenly. I have repeatedly seen persons afflicted in all the different ways I have now described, and which it is necessary for the physician to know that he may be prepared to obviate them; for, if neglected, they will in the end prove equally fatal with the fever itself.

From the state of weakness and irritability described above, people usually recover by pursuing the methods I formerly pointed out; it may be proper however to observe, that as the head is more particularly affected in these fevers, it is sometimes very long before the patient is perfectly free from giddiness, and partial defects of sight: I have sometimes seen the pupils of the eyes remain for several weeks so considerably
dilated,

dilated, with a pulse from a hundred to a hundred and twenty, as to give just grounds to suspect that the brain was materially injured; and yet these symptoms at last have gradually disappeared, and the complete recovery of the patient proved, that they were only the effect of temporary weakness and irritability.

When convalescents become suddenly anasarcaous, they require purging, and commonly receive immediate relief from a brisk purge, combined with squills, or some other diuretic medicine. Cream of tartar with jalap is, perhaps, one of the best purges we can employ in such a case.

When there is reason to apprehend water in the chest, or pericardium, it is necessary to adopt a plan of treatment proper for the cure of this complaint. I need hardly remark, that there would be great impropriety and danger in using fox-glove, in a case where the action of the heart is already so considerably weakened.

Besides the complaints which I have now enumerated, others might be mentioned, as being sometimes brought on by contagious fevers, such as epileptic fits, asthma, diseased liver, jaundice, &c. but as they occur more rarely, and as I have nothing new to offer respecting their treatment, I shall conclude the present subject with the declaration of Sydenham.—

*“ Sicubi circa theoriam me hallucinatum fuisset
 “ lector deprehendat, errori veniam peto;
 “ verum quod ad praxin attinet, profiteor me
 “ omnia ex vero tradidisse, nihilque uspiam
 “ proposuisse nisi quod probe exploratum
 “ habeo.”*

APPENDIX,

CONTAINING

1. A Paper on the Efficacy of the Spiritus Vitrioli dulcis, in the Cure of Fevers, first published in the Medical Communications in the Year 1784; with Remarks.
2. An Examination of the different Means that have been hitherto employed to destroy the Jail Contagion, with the superior Advantages of the nitrous Acid for that Purpose.
3. Letters from the Commissioners of sick and wounded Seamen to the Author, respecting the Jail Distemper at Winchester.
4. Report of the Committee of the House of Commons, upon the same subject.
5. Memorial presented to the Honourable Lord North, &c. &c. &c.
6. Formulæ Medicamentorum, in usum Nosocomii Wincesterensis, conscriptæ.

APPENDIX

1. A paper on the history of the ...
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APPENDIX.

*On the Efficacy of the Spiritus Vitrioli
dulcis, in the Cure of Fevers. By
JAMES CARMICHAEL SMYTH, M.D.
&c. &c. Read April 8, 1783, and
published in the first Volume of the Medical
Communications of London.*

“ WE may observe (says a late eminent
“ writer) * that in fevers in different coun-
“ tries and different ages, besides those re-
“ medies which have a manifest action,
“ physicians have used others, which,
“ though operating imperceptibly, were

* Sir John Pringle, in his Observations on the Diseases of the Army.

“ imagined to be of some efficacy towards
 “ conquering the disease.”

A very little professional experience, will convince any one of the truth of the preceding observation; and a further acquaintance with the subject will as certainly lead him to regret, that whilst the remedies of the second description, which either theory or fashion have introduced, are many and various; the number of the first are extremely limited.

The peruvian bark, the different preparations of antimony, and some of the neutral salts, comprehend, I believe, all the medicines whose efficacy, independent of evacuations, are universally admitted in the cure of fevers. Whether or not the dulcified spirit of vitriol deserves to be added to them, I shall leave others to determine; and confining myself for the present, to the mere duty of an historian, briefly relate a few facts respecting the use of this medicine, which possibly may
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be thought not altogether unworthy of public notice.

The vitriolic acid has been long known as a useful remedy, and stands highly recommended by Riverius and Sydenham, for allaying febrile heat and thirst, abating inflammation, resisting putrefaction and checking hemorrhage; and Sydenham informs us, that he chiefly depended upon this medicine for moderating the eruptive fever in the confluent small-pox.

The spiritus vitrioli dulcis, a composition principally of the volatile vitriolic acid and alcohol*, differs very materially from

* The various productions obtained from the combination of the vitriolic acid and alcohol, are at present better understood, and more accurately distinguished, than formerly. The spiritus vitrioli dulcis, now the spiritus ætheris vitriolici of the London College, is known to be only the vitriolic æther with alcohol, and in the proportion nearly of one to two: the Edinburgh College, indeed, have ordered it to be made of æther and alcohol, exactly in that proportion. The College

from the fore-mentioned medicine, and when prepared in the manner directed by the London College, shews little or no acidity to the taste ; but has a peculiar pungency, and agreeable flavour, resembling the vitriolic æther, or æther of Frobenius, a small quantity of which is commonly mixed with it.

College of London, in their late Pharmacopœia, have ordered æther to be procured from the spiritus ætheris vitriolici, adding a small quantity of the aqua kali, to neutralize or detain any portion of the volatile vitriolic acid which may have come over in the former distillation, and which, perhaps, it is impossible entirely to avoid. The spiritus ætheris vitriolici compositus, or the liquor anodynus mineralis of Hoffman, is the spiritus ætheris vitriolici, with a small addition of (what is called) oleum vini, another production of the same process.

Æther, when combined with alcohol, becomes miscible in water, and, upon that account, is in a more convenient form for being exhibited as a medicine. As there are cases, however, where we may prefer giving the æther by itself, when we do so, it is a necessary precaution to pour the æther first on sugar, before we add the water, which, to a certain degree, prevents its sudden evaporation.

This

This medicine, though long kept in the shops, has very seldom, I believe, been employed in practice; a preparation extremely analagous to it, well known by the pompous title of *liquor anodynus mineralis Hoffmanni* being commonly preferred as an antispasmodic; but neither one nor the other (so far as I have been able to learn) had in this country, ever been used in the cure of fevers, previous to the year 1769; unless the dulcified spirit of vitriol may be said to have been so, as forming part of the composition of a quack medicine sold in town by the name of Clutton's febrifuge tincture*.

It was in the summer of the year 1768, that I began to make trial of the dulcified spirit of vitriol in the cure of fevers. From reflecting on the sensible qualities

* This medicine had long been laid aside, and was little known, when it was again introduced to public notice by Mr. Sutton, who used it in the composition of a drink he gave to his patients under inoculation, which he called his *punch*.

and

and composition of this medicine, I was led to imagine, that I should find it useful as a cordial and antiseptic, in cases of the putrid and malignant kind. A little experience convinced me that my conjecture was well founded, and that the medicine was possessed of powers even beyond what I had at first suspected; but having at that time few opportunities of making such experiments as would prove satisfactory, I applied to a friend, physician to one of the royal hospitals, of whom (after explaining to him my opinion of the efficacy of the medicine) I requested the favour that he would give it *alone*, in the first cases of fever * which should occur at the hospital, and by so doing enable us to judge fairly of its real effects.

* An account of these cases was read in the year 1769, at the Medical Society of London, (the Editors of the medical observations and enquiries) but, for private reasons, which it is needless here to explain, it was not published by them, nor until the year 1784.

The five following cases then, being the first in which it was thus administered, I shall give as they stand in my journal; and having myself minuted down the particulars of each, and taken the reports daily at the bed-side of the sick, I can answer for the truth and accuracy with which they are related.

C A S E I.

Ann Parker, a young woman about twenty years of age, who had been seized with a fever eight days before, was admitted into the hospital on the 25th of October 1768, with the following symptoms, viz. great weakness; lowness and anxiety; oppression at the præcordia, with frequent sighing, and constant drowziness, being always asleep, unless roused by speaking or calling to her; her tongue was white and moist; her neck and breast covered with many small petechiæ of a dark brown colour; the

the heat of her body considerably increased, and her pulse about 120 in a minute.

About five o'clock in the afternoon of the same day, she began to take the dulcified spirit of vitriol in the following form :

R. Spirit. vitriol. dulcis drachmas tres
 Aq. puræ - - - libras duas
 Sacch. albi - - - uncias duas
 Misce capt. uncias duas secunda quaque hora.

October 26th—Pulse 108. She sweated after taking the medicine; rested well in the night, and has less of the oppression and anxiety.

27th—Pulse 94. The medicine agrees with her, and continues to occasion a moisture on her skin; she is still drowsy and dozing, but when roused is perfectly sensible. Having had no stool since her admission into the hospital, she was ordered to take the following bolus at bed-time :

R. pulv. rhabarb - - - scrupulum unum
 Sal. nitri - - - grana decem
 Syrup. simpl. q. s. fiat bol.

28th

28th—Pulse 88. The bolus purged her three times; she continues to have a moisture on the skin; rested well in the night; is always asleep even during the day, and has no complaint but weakness.

29th—Pulse 86. Her skin cool and temperate; and excepting a constant drowsiness, is free from complaints.

30th—Pulse 72. The lowness and drowsiness continue; in other respects she is well. She was ordered beef-tea.

31st—Pulse 62. Her skin is temperate; she is still low and languid; her urine does not break nor deposite a sediment.

Nov. 1st.—Pulse 65. She rested well in the night; as she now begins to loath the medicine, it is discontinued, but not having recovered her appetite and strength, she was directed to take a decoction of bark, and a few days after was dismissed cured.

C A S E II.

William Winfbrough, a young man about nineteen years of age, who had been seized with a fever a week before, was brought to the hospital October 25, 1768. At the time of his admission his skin was extremely hot; his pulse 100 in a minute; he complained greatly of headach, anxiety, debility and dejection. When he endeavoured to put out his hands, or to shew his tongue, they were affected with a remarkable tremor. His tongue was white and moist; his countenance flushed, and the white of his eyes had a turbid appearance. There were florid petechiæ on his neck and breast, with a red rash all over his breast and arms. He was ordered the dulcified spirit of vitriol, in the same manner as in the preceding case.

October

October 26th—Pulse 80. He sweated after taking the medicine ; has passed a good night, and says that he is perfectly easy. Having had no stool, he was ordered a common glyster.

27th.—Pulse 78 Complains of nothing but weakness. The moisture continues on his skin ; his tongue is still moist and white ; the glyster having failed in procuring an evacuation, he was ordered to take at bedtime a rhubarb bolus.

28th—Pulse 66. The bolus has operated four or five times ; he continues to sweat gently ; the medicine agrees with him, and he is so much relieved by it that (to use his own expression) he thinks it has saved his life.

29th—Pulse 68, full and strong. The tremor of his hands still continues, though in a less degree, and his countenance has a dull and heavy appearance.

30th and 31st—Pulse 68. His urine now breaks and deposits a sediment ; he is free

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from

from complaint, and begins to have an appetite for food.

Nov. 1st—Pulse 56. The tremor, petechiæ and rash are now entirely gone; his countenance is more lively; the *spirit. vitriol. dulcis* was now laid aside, and he was ordered to take a decoction of bark and snakeroot.

Nov. 2d—Pulse 52. His urine deposits a lateritious sediment; he still complains of weakness and giddiness, but expresses a desire for meat.

3d and 4th—Grows daily stronger, and has, in a great measure, recovered an healthy appearance. A few days afterwards was dismissed the hospital.

C A S E III.

Sarah Ford, a woman about fifty years of age, was admitted into the hospital on the first of November, 1768. She was of a delicate and weakly constitution, and had
for

for many years been subject to hysterical complaints. About a fortnight before, she had been seized with a shivering, succeeded by heat, headach, pain of her back, violent vomiting and purging. The vomiting had soon ceased, but the purging, though not so violent as at first, at the time of her admission continued, together with headach and pain of the back, anxiety, weakness, lowness and great thirst. Her pulse was 120 in a minute.

The *spirit. vitriol. dulcis* was ordered in the same manner as in the two former cases, only with this difference, that instead of three drachms there was half an ounce put to each quart of water. She was directed likewise to use the *decoct. album* for common drink.

Nov. 2d—Pulse 92. She has only taken the medicine three times, and has always sweated after taking it. Her headach still continues, but the anxiety and pain of her back are greatly relieved.

Nov. 3d—Pulse 72. She slept but little in the night; the purging has entirely ceased; her skin feels temperate, and she has no complaint but giddiness and weakness.

4th—Continues free from fever, but is still weak.

5th—Having no complaint but weakness, is directed to take a decoction of bark, and in a few days was dismissed, cured.

C A S E IV.

Ann Bird, a young woman nineteen years of age, was admitted on the 1st of November, 1768. About six days ago, she was seized with a fever and sore throat, attended with headach and vomiting. The *velum pendulum palati*, uvula, and tonsils were swelled and greatly inflamed. The inflammation was of a crimson colour, with whitish sloughs on the tonsils and uvula.
She

She had great pain in swallowing, and even in speaking; and sometimes a degree of difficulty in breathing. There was a red efflorescence on her face and arms. Her pulse was 120 in a minute. All her symptoms were greatly aggravated towards evening.

She was ordered the *spirit. vitriol. dulcis*, in the same manner as in the two first cases, and also a gargle for her throat.

Nov. 2d—She has sweated constantly, though not profusely, since she began to take the medicine; has had a tolerable night, being neither so hot, nor having so much difficulty of breathing as before. Has bled at the nose in the night, and again this morning. The inflammation and swelling of the fauces are much abated, but the white sloughs remain on the uvula and tonsils; and the red efflorescence is still to be observed on one arm. She can swallow with greater ease, and speaks more

distinctly. Her pulse is 78 and full, and she complains much of giddiness.

Nov. 3.—Her pulse is now 80; her skin cool; her throat greatly better; has this morning again lost a considerable quantity of blood by the nose, and was also sick at the stomach. Upon enquiry I learned that her menses were obstructed, and that the present time was the usual period of their appearance.

4th—Her pulse is 75, and her skin temperate. The redness which was upon her face and arms is entirely gone off; and there is now only a slight inflammation of a pale colour, on the uvula and tonsils.

5th—She is now free from fever, and the inflammation of the fauces is almost entirely gone. She was ordered the bark as in the preceding cases, and in a few days was dismissed the hospital, perfectly cured.

CASE

C A S E V.

Elizabeth Ruffel, forty years of age, about the 27th of October, 1768, was seized with the usual febrile symptoms, accompanied with a sore throat, sickness, vomiting and purging. The vomiting was of short duration; the purging continued for a day or two longer, but on the 2d of November, when she was admitted into the hospital, had entirely ceased. Her complaints were now a soreness and stiffness of her neck, violent headach, and pains in her limbs. Her arms and hands appeared swelled, and there was a red efflorescence on her arms. The inflammation of the fauces was confined in a great measure to the *velum pendulum palati* uvula, and *amygdalæ*, which were of a deep red colour; her pulse was 130 in a minute.

L 4

She

She was ordered the *spirit. vitriol. dulcis*, as in the three preceding cases.

Nov. 3.—Her pulse is still 130; she has sweated a little in the night; finds herself no better, and thinks that her headach is rather worse since taking the medicine.

4th.—Pulse 140.—She does not sweat after taking the medicine; complains principally of pains in her limbs, and imagines that she has, in some measure, lost the use of her lower extremities. Her throat is not so much inflamed, and the inflammation is of a paler colour. Being costive in her body she was ordered a glyster, and a solution of cream of tartar in water for her common drink. The dose of the *spirit. vitrioli dulcis* was also encreased in the following manner:

R. Spirit. vitrioli dulcis	- -	drachmam unam
Aq. puræ	- - - -	uncias quatuor
Syrup simp.	- - - -	drachmas duas
M. F. Haustus tertiis horis sumendus.		

Nov.

Nov. 5th.—Pulse still 130 —She has got out of bed this morning and looks tolerably well. Her tongue is clean; the inflammation of her throat is greatly diminished, and she has now no anxiety. The redness remains on her arms although her skin feels temperate. She complains much of pain and weakness in her limbs; says that the medicine occasions no sweating, though it heats her much. She has had some loose stools since she used the cream of tartar drink.

She was ordered to lose twelve ounces of blood, and to take the *spirit. vitrioli dulcis*, in the quantity and form first prescribed.

6th.—The headach and pains of her limbs continue; the heat of her body is temperate; the efflorescence on her arms entirely gone, and there is only a slight redness remaining on the uvula and tonsils. Her pulse is still 130 in a minute, and intermits after every sixth or eighth pulsation.

She

She says that the medicine, even in the present form, makes her hot and thirsty; and as it appeared to have no effect in relieving her pains, it was discontinued, and a volatile julep was substituted in its stead, which agreed well with her, and she soon recovered.

The *spirit. vitrioli dulcis* was administered in two other cases of fever besides the foregoing; in one of which it succeeded, but failed in the other; of these I can give no particular account, some private business having interrupted my attendance at the hospital. I was, however, informed, that in the case in which it was unsuccessful, though the dose had been increased to a drachm, and continued for four or five days, it never occasioned any permanent diaphoresis, nor lessened the frequency of the pulse; but in that in which it succeeded, it produced a diaphoresis, and operated much in the same manner as in the four first cases.

The

The following table shews, at one view, the daily alterations in the frequency of the pulse.

Day.	Case 1.	Case 2.	Case 3.	Case 4.	Case 5.
1	Pul. 120	Pul. 100	Pul. 120	Pul. 120	Pul. 130
2	— 108	— 80	— 92	— 81	— 120
3	— 94	— 78	— 72	— 80	— 140
4	— 88	— 66	— —	— 75	— 130
5	— 86	— 68	— —	— —	— 130
6	— 72	— 68	— —	— —	— —
7	— 62	— 68	— —	— —	— —
8	— 65	— 56	— —	— —	— —

Whoever considers with attention, the preceding cases, and is acquainted with the usual progress of fevers, accompanied by symptoms similar to those described, will readily allow, that these examples, though not very numerous, are sufficient evidence of the efficacy of the medicine in question; and that its power in removing the anxiety and reducing the frequency of the pulse, was too remarkable to escape the notice even of the most careless of the profession. But although the foregoing cases may

may be thought fully to prove the efficacy of the medicine, it will, perhaps, be expected, that after fifteen years experience I should give some more recent instances of its success, or some further observations respecting its use. Of its success, it would be an easy matter for me to give more examples, and to add to them some respectable testimonies from others, but the society will probably be of opinion, that it is better to avoid the tediousness of medical cases and to give the result, rather than the detail of my experience on this subject.

In the first place, I think it necessary to observe, that any physician who shall give the dulcified spirit of vitriol indiscriminately in fevers, and expect to meet with the same success which followed these first trials of it, will, in all probability, be disappointed; as the medicine, though of undoubted efficacy in certain cases, is by no means of general application.

In

In the acute rheumatism, and in the various forms of the inflammatory fever, it is extremely improper; even in the case of Elizabeth Ruffel, which appeared to me at the time a kind of *arthritidis vaga* (or what is vulgarly called rheumatic gout) it evidently aggravated the complaint.

In hectic and pulmonic cases, the advantage derived from it is trifling or doubtful.

In the remittent and common putrid fevers, I have sometimes also prescribed it without any apparent benefit; it is, however, but justice to acknowledge, that in such cases, I have never yet observed any bad consequence to follow from its use; and that even where it failed of success when given alone, it has been productive of the best effects, when joined with small doses of emetic tartar.

I may likewise with truth affirm, that in the low state of putrid fevers, (where cordials are wanted) it is one of the best medicines

dicines of the kind, and I think greatly assists the bark in resisting the septic tendency of the disease. But the cases of all others, to which it seems to me the most peculiarly adapted, and where I have seen it produce the most sudden and surprising effects, are those fevers occasioned by contagion, or what are commonly called the jail or hospital * fevers. In these, as its cordial powers are more immediately necessary, so they are in general more evident and striking; its operation also as a diaphoretic, is here of the utmost consequence: for by promoting a perspiration or sweat, it promotes the only method in my opinion, by which these fevers (unless at the very beginning) can possibly be cured. Upon the whole, I esteem the dulcified spirit of vitriol a medicine of great utility in the cure of putrid fevers in

* For a description of these fevers *vide* Sir John Pringle on the Jail Fever; and Dr. Lind's Essays on Fevers and Infection.

general,

general, and more particularly so in those arising from contagion; nor do I know (excepting perhaps emetic tartar, or some similar antimonial) any one medicine to be preferred to it; not even the peruvian bark itself, though so strongly recommended by Sir John Pringle *, an authority in physic to which I shall always pay the highest deference and respect.

* It is a circumstance perhaps deserving our notice, that in the cure of the jail fever, Sir John Pringle never gave the bark till the third or last stage of the disease; a period when I apprehend the cure to be very much out of the reach of art, and when all the advantage to be derived from any medicine is merely the palliating or obviating of symptoms. Neither would the success attending his practice induce us to follow his example, as he acknowledges, with his usual candour, that at Ipswich he lost at least one fifth of his patients.

REMARKS.

R E M A R K S.

AS it is now twelve years since the preceding paper was published, and near six and twenty years since these first trials were made, I certainly have had time enough to judge of the effects of this medicine, and of the cases in which it is proper to be given, and have no hesitation in declaring, that the result of my experience is only a confirmation of what I have already published on the subject. The spiritus ætheris vitriolici, or vitriolic æther, which is nearly one and the same thing, I have generally found a medicine of great service in contagious, petechial, and low nervous fevers * : although I have
always

* As our distinctions of fevers are by no means accurate, nor is it possible they ever can be so, (if, as I have alledged, they are only varieties of the same disease,

always observed the most remarkable effects from it in the first. Its sensible and more immediate operation, in this fever, is to relieve the lowness, anxiety, tremors, &c.

to

disease, and varieties that run into each other) it becomes necessary to define the terms we employ. By *contagious fever*, then, I would be understood to mean, not a fever that is capable of being communicated, because most fevers are so more or less, but a fever caused by the contagion of the human miasmata, or by a very highly putrid vapour.

Petechial fever, is a term also very ill defined ; for, as petechiæ frequently occur in all putrid fevers, it may be said, that they cannot distinguish any particular species, nor constitute a specific difference. This I readily admit ; but it is sufficient to my purpose, as a practical physician, that petechiæ appear at some seasons, and in some fevers, more frequently and more constantly than in others ; neither do they depend upon the violence of the disease, nor, apparently, upon the violence of the cause ; nor do they appear to have any certain relation with the general tendency to putrefaction ; but from whatever circumstance of the disease, or of the constitution they arise, I have remarked that the spiritus ætheris vitriolici, given with the infusion of roses, has, in this case, an excellent effect.

M

L^oru

to lessen the irritability of the stomach, the irregularity and frequency of the pulse, and to cause a moisture or perspiration on the skin; in short, I have never yet seen any medicine given, whose efficacy is so sensibly felt by the sick themselves, or which seems to bring the disease to so speedy and happy a termination: but, as my testimony, or the communications of friends, may be suspected of partiality, I shall adduce an evidence on the subject, to which no such objection can be made.

An essay on the malignant pestilential fever, which lately appeared in the West-Indies has within these few days fallen into

Low nervous fever, is a term equally undefined with the former. I only mean to express by it those cases of fever where lowness and weakness is a principal symptom; not however when the weakness is directly and immediately caused by the fever, but when it is natural to the constitution, or is the effect of previous debilitating causes, operating either on the body or mind; or, is the consequence of fever continuing beyond the usual period of acute diseases.

my

my hands, in which I find the following observations * :

“ Æther was the only medicine that
 “ was in any degree truly and permanently
 “ beneficial, in enabling the stomach to
 “ receive and retain the peruvian bark.
 “ Many cases fully evinced this; and a
 “ few occurred in my practice, wherein *the*
 “ *cure was completed by this medicine alone.*”

This gentleman's evidence I consider as the more important, being the testimony of a man of observation, and whose book is written expressly for the purpose of recommending another practice, and another remedy. Again,

“ The only writer † I have met with,
 “ who recommends the use of æther in

* Vide Chisholm on the Malignant Pestilential Fever, introduced into the West-Indian islands from Boulam, &c. p. 192.

† It would appear that Dr. Chisholm had never read the Medical Communications of London, or did not imagine that æther and the spiritus ætheris vitriolici were in fact the same medicine.

“ malignant pestilential fevers, is M. Poif-
 “ sonnier: “ *C'est dans ce cas-ci surtout*
 “ *qu'on peut proposer avec confiance quelques*
 “ *petites doses d'éther vitriolique sur du sucre,*
 “ *afin de combattre plus efficacement la*
 “ *pourriture, et de retablir le ton de l'estomac,*
 “ *et de toutes les parties. Ce remede ranime,*
 “ *sans être incendiaire, et semble devoir rem-*
 “ *plir ici la double indication de soutenir les*
 “ *forces de la nature, et de s'opposer à la*
 “ *putrefaction des humeurs. Je sais qu'à*
 “ *la Cayenne, où une maladie, à peu-près de*
 “ *cette nature, a enlevé les quatre cinquièmes*
 “ *des personnes qui étoient passées dans cette*
 “ *colonie, plusieurs malades réduits à l'ex-*
 “ *trémité, ont dû leur guérison à l'usage qu'ils*
 “ *ont fait de ce remede, et qu'ils prenoient*
 “ *même en assez grande quantité*.”* This
 “ ample testimony (continues Dr. Chif-
 “ holm) was sufficient encouragement to

“ * *Maladies des gens de mer. tom. I. p. 351. See*
 “ also something nearly to the same purpose in “ *Ob-*
 “ *servations sur les Maladies des Negres, par M.*
 “ *Darille.”* p. 49.

“ try it in a malady that had hitherto re-
 “ sisted all the means usually recurred to.
 “ The event justified the practice. I
 “ gave the æther in the following manner.
 “ The patient being allowed to remain
 “ undisturbed about an hour, I gave him
 “ about a tea-spoonful, in about half a
 “ wine-glassful of cool water. After this
 “ he continued undisturbed about two
 “ hours, when the dose was repeated. At
 “ the expiration of another hour, the bark
 “ was offered him ; and, if he swallowed
 “ and retained it, the æther afterwards was
 “ given only once in five or six hours.
 “ But as this very seldom happened, it
 “ was generally necessary to repeat the
 “ æther in the same quantity every three
 “ hours, till the spasm of the stomach was
 “ entirely overcome. Æther, given in the
 “ manner I have mentioned, is extremely
 “ grateful to the patient ; it occasions an
 “ agreeable warmth along the œsophagus,
 “ and gently stimulates the stomach. This

“ effect, however, does not continue long ;
 “ but the frequent production of it at
 “ length gives it permanency. It appears
 “ to act as a tonic, an antiseptic, and an
 “ agreeable stimulant ; a warm glow over-
 “ spreads the surface, and thirst, nausea, and
 “ oppression often have fled before it.”

Whoever compares the preceding obser-
 vations of Dr. Chisholm and of Mons. Poif-
 sonnier with what I have written on the
 same subject, must be struck with the
 exact similitude between them. In respect
 to this I shall only say, that though one
 man may be mistaken in his observations,
 from seeing the effects of remedies in too
 strong a point of view, or, from having his
 judgment misled by prejudice, or by vanity ;
 yet, when different men, in different coun-
 tries, and at different times, without having
 any communication with each other, agree
 in observing the same fact, there can be
 little doubt of the truth of their observation.
 The only merit I can claim, if it can be
 reckoned

reckoned such, is the having been the first to point out the efficacy of this medicine in contagious fevers; and I am still the only one who has attended to its effect, in reducing the frequency of the pulse.

An Examination of the different Means hitherto employed to destroy the Jail Contagion, with the superior Advantages of the nitrous Acid for that Purpose.

THE various means hitherto employed for destroying contagion, may be arranged under two distinct heads, or classes, viz. the Physical, and the Chemical.

I formerly took notice that contagions, whether specific or putrid, are either checked, or completely destroyed, by the extremes of heat and cold ; and that they are also, by a free exposure to air and water, so diluted or dissolved, as to lose their noxious quality. Heat and cold then, with air and water, may be looked upon as physical agents, which, under certain circumstances, are effectual in blunting or destroying contagion. A degree of heat, nearly that of an oven, is
found

found necessary for the complete destruction of contagion, but as this degree of heat is incompatible with animal life *, its application is solely confined to the purifying of such clothes, furniture, &c. as cannot be injured by this treatment. But, although the degree of heat requisite for the complete destruction of contagion can only be used for one particular purpose, heat and fire, judiciously managed, may, in various ways, tend to lessen the power, or to check the progress, of this pernicious vapour: for, as closeness and dampness are favourable to the production and spreading of contagion, drying and rarifying the air, by counteracting these, must, so far at least, be proper antidotes. But, independent of

* A great heat like that of an oven, such as would prove destructive to all animal life, effectually destroys this infection in all substances which can be for some time exposed to it. Vide Lind's Observations on the Jail Distemper, Ann. 1779.

those

those effects of heat, an open fire, especially where the fuel is burnt in a narrow flue, is of great benefit ; for, by consuming a portion of the air, it causes a more sensible renewal of it, and, in fact, is one of the best ventilators. In employing fire and heat, however, care must be taken not to increase the heat in the apartments of the sick, as this would prove more hurtful to them, than the drying or renewing of the air could be advantageous.

The degree of cold necessary to destroy contagion is probably, like the degree of heat, inconsistent with life ; and, therefore, although we hear of contagion having been checked or suppressed by cold, there are few instances, if any, of its being completely destroyed. Besides, as it is not in our power to employ cold at pleasure, the question respecting its effect, of whatever importance it may be to the pathologist, is of little consequence to the practical physician.

That

That noxious vapours are hurtful only when concentrated, and are harmless when diffused, are facts or data universally admitted; and it is upon this principle, that clothes, bedding, or other matters to which contagion adheres, are purified, or lose their deleterious quality, by exposure for a sufficient length of time to the open air, or to a current of water; but, as the time requisite for this mode of purification is uncertain, and as contagious clothes, goods, &c. cannot always be exposed in a proper manner*, we are commonly under the necessity of having recourse to those more expeditious means of purification which chemistry affords, and which I shall next examine.

* Dr. Lind has very justly remarked, that no ventilation or admission of air into prisons or hospitals, can remove or destroy contagion when once it is present. The same may be said of water. But though neither one nor the other under those circumstances can destroy contagion, both may be usefully employed in blunting its force, and in preventing the spreading of the disease.

The

The chemical means hitherto employed for destroying contagion, are the following :

Burning sulphur with charcoal.

—— with arsenic.

nitre.

gunpowder.

portfire.

tar.

tobacco.

wood.

Boiling vinegar.

—— with camphire.

tar.

Washing with vinegar.

White-washing.

Painting.

The vapour produced by the burning of sulphur, is known to be the volatile vitriolic or sulphureous acid, one of the most powerful of the mineral kingdom, and the effect of it in destroying contagion has been
long

long established ; but as it affects, even in small quantity, the respiration of animals, inducing suffocation and death, it can only be employed for fumigating clothes, furniture, or empty apartments. When burnt with charcoal, in the common way, we obtain not only the sulphureous acid, but also the carbonic, or fixed air, which, though it can have little influence on contagion, renders the common air less fit for respiration ; a circumstance hardly deserving attention where the sulphur is burnt in a fumigating room, or a place set apart expressly for the purpose of fumigation, but which is of great importance when sulphur is burnt between the decks of ships, or in hospital or prison wards, where men are soon afterwards to be lodged. The occasional addition of arsenic seems to have been made by Dr. Lind, with a view of increasing the deleterious quality of the vapour ; but it appears unnecessary, as the sulphureous acid is of itself sufficiently powerful for destroying contagion ;
besides,

besides, I doubt much, if the vapour of arsenic is not too heavy to rise with the acid of sulphur.

Burning or deflagrating nitre.—Having had some experience of the efficacy of the nitrous acid in destroying contagion, and being sensible of the disadvantage of fuming hospital or prison wards by burning sulphur with charcoal, as was commonly practised, I resolved to employ nitre, instead of sulphur, at Winchester; never doubting that I should obtain, by deflagrating nitre, a portion of nitrous acid, as well as the nitrous air or oxygene; but a farther acquaintance with chemistry convinced me of my mistake, and that the deflagration of nitre never produced any nitrous acid. It is therefore evident, that deflagrating nitre in the prison and hospital wards at Winchester, could have no effect in destroying contagion, and no farther effect in purifying them, but so far as it furnished a quantity of oxygene, or air much purer than the common air of the atmosphere.

I observe

I observe, in Dr. Rush's publication on the yellow fever of Philadelphia, that the physicians of that city lately fell into the same mistake that I formerly did, *viz.* deflagrating or burning nitre as a means of destroying contagion.

Burning gunpowder.—If there is no nitrous acid obtained by burning or deflagrating pure nitre, we cannot expect to procure any from burning gunpowder *, either wet or dry †. The charcoal in the composition possibly yields a small quantity of carbonic acid, whilst the sulphur, uniting chiefly with the alkaline basis of the nitre, forms a hepar sulphuris, as the water used in washing a gun plainly shews.

* Gunpowder consists of seventy-five parts of pure nitre, fifteen and a half of charcoal, and nine and a half of sulphur.

† Next to the smoke of wood, for purifying a tainted air, I esteem that of gunpowder. This I often use, as being quite inoffensive to the lungs, &c. Vid. Lind on Fevers and Infections, p. 51.

Burning

Burning portfire *.—This composition of sulphur, nitre, and charcoal, has likewise been employed † for destroying contagion; and as the sulphur in this is the predominant article, it will perhaps furnish some sulphureous acid, though I should apprehend not a sufficient quantity to be effectual in destroying contagion.

Burning tar ‡.—The use of tar seems natural enough to sailors, who may be supposed partial to what they are constantly accustomed; but, if we examine the subject with attention, it is evident that the vapour arising from tar, whether burnt or boiled, must be a weak agent against contagion. The empyreumatic oil can be of no service but by opposing one disagreeable smell to another, whilst the ligneous acid, at best a

* Portfire is made of one half sulphur, one fourth nitre, and as much charcoal.

† Vid. Chisholm on the West India Fever.

‡ By smoaking this ship (Revenge) well with the vapour of tar, the infection had abated. Vid. Lind, p. 2.

weak

weak one compared with the mineral acids, is in great measure destroyed by burning, and is so diffused in the vapour of boiling tar, as to prevent entirely any effect which this acid, in a more concentrated state, might otherwise produce.

Burning tobacco.—There is an antient prejudice respecting the antipestilential quality of tobacco, founded, I believe, on a tradition which is entirely void of truth, that the plague never entered a tobacco shop. Dr. Lind however seems to have had a high opinion of it*, but upon what this was founded I cannot pretend to say, as the smoak of tobacco, so far as I can perceive, has no advantage

* When prisoners can be removed, the infection will most effectually be extinguished by their removal to another prison, and, after thoroughly cleaning the infected one, to fumigate with the smoak of tobacco, &c. Vide Dr. Lind's Health of Seamen, p. 337.—Dr. Lind had so high an opinion of the power of tobacco, that he advised the buying up all the damaged tobacco, to be employed for this particular purpose.

N

over

over the smoak of any other vegetable matter.

Burning wood.—The smoke * of a wood fire was reckoned, by Dr. Lind, one of the most powerful means of destroying contagion, and he gives several examples where it was successfully employed. I might perhaps remark that some of these examples he had from persons who were not such accurate observers as himself; I shall not however call them in question, as I think the advantage supposed to be immediately derived from the smoak of wood, may fairly be ascribed to other causes. In the first place, the smoak of wood consists principally of soot, or of inflammable matter un-

* A judicious application of fire and smoak, is the true means appropriated for the destruction and utter extinction of the most malignant sources of disease. Again. It hath been experimentally found, that the smoak of a wood fire serves not only to lessen the force or violence of such poisons, but is also an excellent protection against their being conveyed. Vide Lind's papers on Fevers and Infection. Paper 1. p. 49.

consumed,

consumed, with some carbonic acid, neither of which can have any effect on contagion; whilst the ligneous acid is in very small quantity, too small certainly to be of much service. But we know, that where there is smoak there is heat, and that where there is much smoak, in places where people are present, a free admission must be given to the air; two circumstances which have considerable influence in weakening the virulence, and in preventing the spreading of contagion.

Boiling vinegar.—Vinegar * has, at all times, been considered as the grand antidote to contagion, though I believe it to be one of the most trifling means that has ever yet been employed. I have never

* The cascarilla bark, when burning, gives a most agreeable scent to the chambers of the sick, and so is at least an elegant preservative, and may prevent bad smells from taking effect. The steam of boiling camphorated vinegar is still more powerful for this purpose. Vide Lind on Fevers and Infection. p. 51.

once observed the smallest benefit from its use ; and have known many fatal examples of contagion having been communicated where it was constantly employed. But although the steam of boiling vinegar can be of no advantage in destroying contagion, yet, as the smell of it is grateful to the sick, it may for that reason be used about their persons ; and when camphire is dissolved in it, the smell is still more agreeable and reviving.

Washing the furniture, floors, walls, &c. with vinegar, I consider as little better than washing them with simple water. The same may be said of white-washing, as the lime and size can have no particular effect. Oil-painting, another mode of purifying apartments, has little advantage over the preceding ; not to mention the expence and inconvenience attending it.

But enough has been said to shew the general want of chemical knowledge, apparent in all the methods hitherto proposed for

for destroying contagion, and more especially, the inefficacy of the methods employed in places and situations from which people could not be removed ; I shall now proceed to a more agreeable task, and explain those improvements, which a more accurate chemistry, and a long attention to the subject, have suggested to me, and relate some experiments which I made, with a view to ascertain the efficacy of the nitrous acid, and the safety with which it may be used, where people are necessarily present.

The mineral acids, particularly when in a state of vapour, with the different gases or permanently elastic fluids produced by them, are probably, excepting fire, the most powerful agents in nature, and the source of an infinite number of the different forms of matter observable in the mineral kingdom, and which are constantly undergoing fresh changes, from their various combinations, and decompositions. But their power is not confined to the mineral

kingdom; they are known to have great influence likewise over putrefaction, and those other spontaneous changes which vegetable and animal matter, deprived of life, undergoes; and therefore, if the jail contagion, as I have endeavoured to prove, is a vapour produced by putrefaction, there cannot be a doubt that the mineral acids will prove effectual in destroying it. So far we may reason *a priori*; but let us next consult experience, a less fallible guide. From this it appears, that the volatile vitriolic or sulphureous acid, the only one hitherto made use of, proves effectual in destroying contagion; although, owing to its deleterious quality, it cannot be employed, except in situations from which people can be removed. But, are the other mineral acids in a state of vapour equally dangerous with the sulphureous? and, are they equally effectual in destroying contagion? To the first of these questions I can give a positive answer; to the second I can give one that, at least, is highly probable.

In

In the first place, I can safely affirm, that the nitrous acid may be employed in very great quantity without risk, and even without the smallest inconvenience ; and, that it is effectual for the destroying of contagion, I have every reason to believe, not only from analogy, but from experience. I had frequently used the nitrous acid, as a fumigation, in hospital wards, and in the private apartments of the sick, without perceiving any unpleasant effect from it ; but, to ascertain with more precision a fact of this importance, I made the following experiments ; in the conducting of which, Mr. Hume of Long-acre, a very ingenious man, and an excellent chemist, was so obliging as to favour me with his assistance.

We put a mouse, confined in a wire trap, under a glass cylindrical jar, capable of holding about 25 pints beer measure, or 881 cubic inches ; the jar was inverted upon wet sand, contained in a flat earthen trough or

pan ; it was then filled with the fumes of the smoaking nitrous acid, introduced by means of a crooked glass tube, until the animal could not be very distinctly perceived. The mouse was kept in this situation for a quarter of an hour, when the jar was removed, and the animal exposed to the open air ; it immediately ran about the wire trap, as usual, and had not the appearance of having suffered the slightest inconvenience from its confinement. After a few minutes, the mouse was again put under the glass jar, which was now filled with the vapour of pure nitrous acid, detached from nitre by the vitriolic acid. It remained much about the same time as before, and when the jar was removed, seemed perfectly well.

We repeated the same experiments with a green-finch, only with some little variation in the manner. We placed, on a table covered with green baize, a brown earthen vessel or pan, containing heated sand ;

sand; in this was put a glass saucer, with about half an ounce of strong vitriolic acid; above which we placed the bird-cage, supported with some small pieces of wood laid across the pan; then, adding a drachm or two of nitre, in powder, to the vitriolic acid, we covered the whole with the glass jar. The nitrous acid rose in such quantity, that, in a very little time, the bird seemed as if in a cloud or fog. We kept it in this situation fifteen minutes, by which time the cloud had disappeared, and the acid was in part condensed on the side of the glass jar; during the whole time the bird neither panted, nor appeared to suffer any uneasiness, from the atmosphere in which it was confined. We made trial also of the marine acid, by adding common salt, instead of nitre, to heated vitriolic acid: during this experiment, the bird appeared to be, now and then, somewhat uneasy, and opened its bill; but, at the end of fifteen minutes,
upon

upon removing the jar, it hopped about as lively as before. We then exposed the bird to the fumes of sulphur, burnt with an eighth part of nitre; it immediately gave signs of uneasiness, opened its bill, and seemed to pant for breath in such a manner, that we were afraid to cover it with the glass jar. We likewise made trial, in the open air, of the oxygenated marine acid*; for, as this is so extremely deleterious, we did not think it safe to expose ourselves to the vapour of it in a room, nor did we venture to expose the bird to it in any other way but in the open air, and even there it appeared to suffer very much.

Having made trial of the effect of the different mineral acids, in a state of vapour,

* The oxygenated marine acid is a discovery of the famous Scheele, and has been recommended by Berthollet and Chaptal, two French chemists, for the purpose of bleaching. I am informed that it has also been lately used in France to destroy contagion, but the particular circumstances, and manner of its application, I have not yet learnt.

upon

upon animals, we determined to render the experiment still more conclusive, by trying what effect they would have on ourselves. With this intention, we filled the room * in which we were with the fumes of nitrous acid, (obtained by mixing nitre with heated vitriolic acid, in the manner already described) until the different objects became somewhat obscure, by a kind of fog or mist produced. The fire irons, and steel fender, lost their polish, and the vapour arising from a bottle of aqua ammoniæ puræ, placed at some distance from the table, was evidently neutralized, as it issued from the bottle, by the vapour of the nitrous acid.

Mr. Hume and I remained in the room the whole time, without perceiving the slightest inconvenience; the fumes did not excite coughing, nor affect the eyes, in the way

* The room in which we made the experiments was a small parlour 13 feet by 10, and 8 feet high; or about 1040 cubic feet.

the

the smoke of wood commonly does, even when I held my head over the glass saucer, and breathed them immediately arising from it. We made trial likewise of the effect of the marine acid, which we found more pungent and stimulating than the nitrous; but, though it excited coughing, it did not cause that constriction of the windpipe, and tightness at the chest, with the sense of suffocation, which is immediately induced by the volatile vitriolic or sulphureous acid. Indeed we were imprudent enough to try how far we could breathe this last, but I was instantly obliged to run to the window for air, from the sense of constriction, and of suffocation, which it occasioned. We likewise tried the effect of the mixed fumes of the marine and nitrous acid, a kind of volatile aqua regia, which we found more pungent than the marine acid by itself. As for the oxygenated marine acid, perceiving the effect of it on the bird, and knowing how extremely dangerous

gerous it is, we did not venture to go very near it.

From the preceding experiments, the different acid vapours, in respect to the safety with which they may be breathed, may be arranged in the following order :

- 1st. The vapour of nitrous acid, arising from nitre decomposed by vitriolic acid.
2. Ditto—of nitrous acid in its fuming state, or when the nitrous acid is mixed with nitrous gas.
3. Ditto—of marine acid, arising from common salt, decomposed by vitriolic acid.
4. Ditto—of nitrous and marine acids, obtained from the decomposition of nitre and common salt by vitriolic acid.
5. Ditto—of sulphur, burnt with an eighth part of nitre.
6. Ditto—of sulphur, burnt with charcoal.
7. Ditto

7. Ditto—of oxygenated marine acid*, obtained by putting manganese to marine acid.

As the first vapour is perfectly harmless, in any quantity in which it may be required, it is evidently the most proper to be employed in all situations where people are necessarily present; and if it should prove efficacious in destroying contagion, of which I have not the smallest doubt, it is the *desideratum* †, so much sought after by Dr. Lind; but which he confesses, with his usual candour, he never could find out.

* The oxygenated marine acid is obtained, by distilling marine acid from manganese, but may also be procured in small quantity, by putting manganese to heated marine acid, or by gradually adding a mixture of manganese and sea-salt to heated vitriolic acid.

† A certain method therefore of destroying infection in places from whence persons cannot be removed, is a *desideratum* not yet obtained in physic. I have proposed and tried many things for this purpose without success. Vide Lind's Observations on the Jail Distemper. Edit. published in Oct. 1779.

The

The second, though more pungent than the first, may I believe be employed with the greatest safety; at least, I have never observed any inconvenience from using it. But, as it cannot so easily be procured in considerable quantity, and is attended with greater inconvenience and expence, I have of late years only made use of the first.

Our experiments likewise warrant us to affirm, that the third, or marine acid, though more stimulating, and more apt to excite coughing, than the nitrous, may be safely used, at least in a moderate quantity, where people are present; and where nitre cannot be had, I should have no hesitation in employing it.

Of the fourth I can say but little, only that, in breathing it, I perceived it more pungent than the pure marine acid; and therefore, unless it should be found to possess superior efficacy in destroying contagion, I would not employ it where there are people present.

As

As the fifth never can be used with safety where there are people present, its use must be solely confined to fumigating empty apartments, clothes, furniture, &c.

The sixth should never be employed, as the carbonic acid may do harm, and never can have any effect on contagion.

Of the seventh I have no particular knowledge, only that it is extremely deleterious, and I believe extremely powerful; but whether it has more effect on contagion than the other mineral acids, experience only can determine.

Having now fully proved that the nitrous, and possibly also the marine acid, obtained in the manner already described, may be employed with perfect safety in hospital and prison wards, whilst the people remain in them, I shall, in the next place, relate how far my experience goes to ascertain the efficacy of those acids in destroying contagion.

From

From all the information I can procure, I do not find that any person has ever made use of the nitrous acid to destroy contagion but myself; for, as this acid is not produced by the deflagration of nitre, or of gunpowder, the employment of these cannot be considered as an instance to the contrary. I formerly mentioned, that I had employed the nitrous acid in two different forms; either the vapour arising from the yellow or smoaking nitrous acid, which is a mixture of the acid with nitrous gas, or the more pure nitrous acid, detached from nitre, decomposed by the vitriolic acid. In one or other of those forms I have used it, both in hospitals and in private practice, for sixteen or seventeen years past; and have had the satisfaction to obtain the most decisive evidence of its happy effect, in preventing the spreading, or farther communication, of contagion.

The most highly contagious fevers that occur in our hospitals, do not affect the

O

patients

patients in general lodged in the same ward, but only the nurses, or those patients who assist them, or those who lie in the beds contiguous to the sick; to such persons I have frequently seen the fever communicated, and have also repeatedly prevented the farther spreading of the disease, by placing gallipots, with the fuming nitrous acid, between the beds of the sick and of those who were not yet affected by the contagion. And, in private practice, I can declare with truth, that where the nitrous acid has been constantly used as a fumigation, I have not known an instance of a contagious fever having been communicated, even to a nurse or an attendant.

These facts will, undoubtedly, be allowed to be very strong evidence, with respect to the power of the nitrous acid to destroy contagion; still, however, they are liable to some uncertainty, and I will freely confess, that the effect of the nitrous acid, for this purpose, cannot be said to be fully proved, until

until it has been tried in fumigating tainted clothes, &c. and until its power has been found sufficient to destroy contagion on board of ships, and in prisons and hospitals, where it exists in a much higher degree than I have had occasion to see it, excepting at Winchester.

It will probably be asked, why I did not make a complete trial of it there? To this I answer, that with respect to fumigating infected clothes, bedding, &c. I did not think myself warranted, especially on an occasion of so much importance, to make trial of an uncertain remedy, when a certain one was in my power. As to fumigating the prison and hospital wards, it was evidently my intention to have employed the nitrous acid, but I was mistaken in the means I took to procure it, and have not since had a proper opportunity of repeating the experiment.

The effect of the marine acid, in a state of vapour, on contagion, I have not yet had

occasion to try, but have no doubt that it will be found of sufficient efficacy for destroying it; and, from the foregoing experiments, it is evident that, though not so mild or safe as the nitrous acid, it may be used, in a moderate quantity, even where people are present. The only purpose to which I have applied it, has been, when properly diluted, to wash the hammock posts, bedsteads, and furniture; also the floors, and walls, of the apartments of the sick *: and I am persuaded that, even in this way, it was extremely serviceable, certainly more powerful than the most concentrated vinegar.

I shall now conclude this subject with a few practical rules or observations, which may be looked upon as corollaries, or inductions, from the preceding experiments.

* The washing the hammock posts, walls, and floors of the prison wards with the diluted marine acid, and the removal of all clothes, bedding, &c. proved completely effectual for destroying the contagion at Winchester; as it is now apparent, that the burning or deflagrating of nitre could contribute nothing to the success.

The

The well known efficacy of the sulphureous acid, in destroying contagion, is a sufficient reason for our continuing to use it as a fumigation for clothes, furniture, &c.

The nitrous acid, being attended with no risk or inconvenience to the respiration, and appearing, from our experience, of sufficient efficacy to prevent the farther spreading of contagion, seems the proper antidote to be applied, in all situations where persons are necessarily present, and is, in short, the *desideratum* sought after by the benevolent Dr. Lind.

For purifying empty hospital or prison wards, and ships, I should also prefer the nitrous acid to the sulphureous; as I believe it to be equally efficacious; its vapour is more volatile and penetrating; and it does not leave the disagreeable smell which sulphur does. But, for this particular object, I think it would be adviseable to make trial also of the marine acid, and of the mixture of nitrous and marine acids,

as I am convinced of the efficacy of all the mineral acids for destroying contagion, and our experience is not yet sufficient to determine their relative advantages, and disadvantages.

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

Put half an ounce * of vitriolic acid into a crucible, or into a glass or china cup, or deep saucer ; warm this over a lamp, or in heated sand, adding to it from time to time some nitre or common salt : these vessels should be placed at twenty or thirty feet distance from each other, according to the height of the cieling, or virulence

* As the quantity of vapour depends, in some measure, on the surface, I think it better to have the vitriolic acid put in a number of small vessels, than in one or two large ones ; besides, in this way, it has the advantage of being diffused more readily in any given space.

of the contagion. In hospitals, or prisons, the lamps, or vessels containing heated sand, may be placed on the floor; on board of ships, it will be better to hang them to the ceiling by waxed silk cords. The fumigating lamps, which I have seen at Moyser's, in Greek-street, Soho, a great number of which I was told have been sold to the navy, may be employed for this purpose; although they would answer much better, if the saucer was deeper, and if, instead of a place for a lamp, there was a box proper for containing hot sand, in which the saucer might be placed.

As fumigating with nitrous acid is attended with no inconvenience, and as the process is so simple, and the materials so cheap, it should, as a means of prevention, be employed for some hours every day in transports having troops on board, and in crowded hospitals; and, if there is any appearance of contagion, the fumigation should be executed with more care

and attention, and the vapour confined for several hours at a time. Fumigating vessels, or lamps, should also be placed contiguous to the hammocks, or beds, of persons affected with any contagious or putrid distemper, whether fever or dysentery.

By taking such precautions, a great deal of mischief would probably be prevented, and a stop put, in the beginning, to one of the most fatal calamities * that ever afflicted mankind.

* The late dreadful mortality in the West-India islands, occasioned by a contagious fever imported from Boulam, has made too deep an impression on the minds of the people of this country to be soon forgotten, and every exertion on the part of the executive government will no doubt be made to prevent a repetition of the same tragedy.

SINCE writing the above, I have had the pleasure of seeing the last publication, and, as I imagine, the latest improvements, of the French chemists and physicians on the subject of contagion, and on the proper means of destroying it. It is intitled, “*Instruction, sur les moyens d’entretenir la salubrité, et de purifier l’Air des Salles, dans les Hopitaux militaires de la Republique, fait au Conseil de Santé le 5 Ventose, l’An 2d de la Republique francaise une et indivisible.*”

This *instruction*, or *memoire*, is divided into three parts. The first relates solely to the means of cleanliness; the second to what are called the mechanical means; and the third to the chemical. The two first parts contain nothing new or interesting; the third is of the greatest importance to medical science, and particularly so to me,

as

as it furnishes a proof of the accuracy of some of the preceding experiments, and is a complete confirmation of the opinions I have long entertained respecting the nature of contagion, and the power of the mineral acids to destroy it.

The French physicians, instructed by that excellent chemist *Le Citoyen* Guiton, better known by the name of *Monfr. de Morveau*, of *Dijon*, have lately made trial of the marine acid in their hospitals, and have found it equally effectual in destroying contagion as the sulphureous, and, as being more volatile, perhaps even preferable for the purpose of purifying hospital wards. They also remarked that, in a smaller proportion, it may be safely used in hospital wards, even when people are present *. The French physicians however have not employed the nitrous acid, nor made any trials of its effect on

* My experiments shewed the same thing.

contagion ;

contagion; neither do they appear to have suspected that the power of destroying contagion was a quality inherent in all mineral acids; and probably, to a certain degree, in all acids, under certain circumstances. Although their experience of the effect of the marine acid, together with my observations on that of the nitrous, seem to establish the fact beyond the cavil of scepticism itself.

Their method of obtaining the marine acid is the same that I took to procure the nitrous; they either employed the fuming marine acid, or the acid detached from its alkaline basis by vitriolic acid, using a considerable degree of heat for that purpose*. They likewise, upon the suggestion of M. Fourcroy, recommend adding a small quantity of the oxygenated marine acid; but, as they do not pretend to say that they

* The reader will find at the end an account of their process.

have

have had any experience of the superior efficacy of this, and as the common marine acid has been found to answer the purpose, I do not see any reason for making so hazardous an addition.

Another chemical process for purifying foul air in hospitals, recommended in this *instruction*, deserves our notice. It consists in placing, at different distances in the hospital wards, vessels with lime water, for the purpose of absorbing carbonic acid or fixed air. I am inclined, however, to believe, that this advice is more the result of chemical theory than of practical observation; for I do not suppose that carbonic acid is ever present, (where there is a free admittance of air,) in sufficient quantity to prove hurtful; at least, it can only affect the breathing, and has nothing in common with contagious vapour.

The French physicians appear to me to have fallen into a considerable mistake on this subject, in taking the quantity of

carbonic acid present *, in an hospital, as a test of the quantity or malignity of contagion, when, in reality, they are two things totally distinct from each other. The first, or carbonic acid, is a constituent part of the common or atmospheric air, which is greatly increased by the respiration of animals, and by burning candles, lamps, &c. and, when in too great quantity, extinguishes flame, and animal life: the other has no relation with the composition of the atmosphere, never affects respiration, but is produced by putridity, and excites fever.

* The method proposed by the French physicians, for ascertaining the quantity of carbonic acid present, is simple and ingenious. Take two phials; let one be filled with common water, the other with lime water. At the place where you want to try the purity of the air, empty the phial of common water, then, filling it half full with lime-water, and corking it, shake the phial for some time: the quantity of sediment shews the proportion of carbonic acid. But, to render the preceding experiment conclusive, the height from the ground at which the air is taken should be stated, otherwise we are liable to great fallacy.

Extract

Extract from the “ *Instruction, sur les*
 “ *Moyens d'entretenir la salubrité, et de*
 “ *purifier l'Air des Salles dans les Hôpi-*
 “ *taux militaires de la Republique, &c.*
 “ *&c. &c.*”

“ *Au nombres des moyens que la chimie a*
 “ *employés avec un succès que tient du prodige*
 “ *pour operer cette depuration, nous citerons le*
 “ *procedé que Guiton, (Mons. de Morveau)*
 “ *representant du peuple, a mis en usage*
 “ *en 1773, dans la ci-devant cathedrale de*
 “ *Dijon, infectée par des exhumations, au*
 “ *point qu'on fut obligé de l'abandonner.*

“ *Ce moyen consiste à repandre dans l'at-*
 “ *mosphere, de l'acide muriatique (acide ma-*
 “ *rin) en etat de gaz degagé par l'intermède*
 “ *de l'acide sulphuric ; (huile de vitriol) voici*
 “ *le procedé pour désinfecter une salle de 40*
 “ *a 50 lits.*

“ *Après avoir évacué les malades sur une*
 “ *des salles de rechange, disposez dans le milieu*
 “ *de*

“ de la salle vuide, dont les fenêtres & les
 “ portes seront fermées, un fourneau garni
 “ d’une petite chaudière ou capsule de fer,
 “ à demi remplie de cendre tamisée sur
 “ laquelle on posera une capsule de verre
 “ de grès, ou de fayance même, chargée de
 “ neuf onces de muriate de soude, (sel marin,)
 “ légèrement humecté avec une demi-once au
 “ plus d’eau commune. Le feu étant allumé
 “ à la capsule échauffée, on versera sur le
 “ sel marin quatre onces d’acide sulfurique,
 “ ou huile de vitriol de commerce. En un
 “ instant l’acide sulfurique agira sur le sel
 “ marin, dont l’acide se mettra en expansion;
 “ l’opérateur, qui sera le pharmacien en chef,
 “ ou un de ses aides, versé dans le manuel des
 “ opérations chimiques, se retirera, en fermant
 “ la porte sur lui, et emportant la clef; douze
 “ heures après on entrera dans la salle, on
 “ ouvrira portes et fenêtres, pour établir des
 “ courans d’air, et évacuer celui qui pourroit
 “ être encore chargé d’acide. On donnera
 “ une plus grande latitude d’utilité à ce pro-
 “ cédé

“ cédé en l'appliquant aux salles même rem-
 “ plies de malades, toutes les fois que les
 “ officiers de santé le jugeront nécessaire.
 “ Ainsi lorsqu'on aura reconnu que l'air d'une
 “ salle est surchargé de miasmes animaux,
 “ et a besoin de cet excellent purificateur,
 “ il suffira de faire le tiers du mélange ci
 “ dessus, et même moins, et de la parcourir
 “ plus ou moins lentement, & dans tout les
 “ points, le rechaud à la main, au moment
 “ où le gaz se met en expansion.
 “ Lorsque la salle sera jugée suffisamment
 “ rempli de gaz acide muriatique, on trans-
 “ portera l'appareil dans les latrines, afin
 “ que les dernières portions gazeuses que le
 “ mélange pourra continuer de fournir servent
 “ à neutralizer les gaz ammoniacaux pu-
 “ trides, qui se developpent contiuellement
 “ dans les privés.

*Letters * from the Commissioners of sick and wounded Seamen to the Author, respecting the Jail Distemper at Winchester.*

Office for sick and wounded Seamen,
30th May, 1780.

S I R,

AS you have so obligingly consented to favour us with your assistance to the sick Spanish prisoners at Winchester, we trouble you with the enclosed letter to our agent and surgeon, to give you every information respecting the directions they are under for the treatment of the prisoners in health, as well as the sick ; and they are directed to pay a due attention to whatsoever you shall recommend to be done for the regula-

* These letters were thought necessary to explain some facts, and will serve as vouchers for others.

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tion

tion of the hospital. And if you judge that any alteration in the diet or mode of treatment of the prisoners in health is necessary, we are to desire you will please to favour us with your sentiments upon that subject; and that you will communicate to us what at any time you may judge necessary, concerning the service in general.

We very sincerely wish you health, and hope we shall shortly have the pleasure to learn your endeavours have been attended with the happiest success. We are,

S I R,

Your most obedient,

humble servants,

J. BELL,

WALTER FARQUHARSON,

VIN. CORBETT,

ROB. LULMAN.

S I R,

Office for sick and wounded Seamen,
the 5th June, 1780.

S I R,

WE received this morning, by express, your favour of the 4th. We were very glad to learn that the assistance of Mr. Curtis, the Spanish priest, whose influence over the prisoners we had reason to believe might be very serviceable, had been procured.

We shall give directions to the agent for the having the prisoners obliged to give up their clothes and bedding, in order to their being well fumigated, labelled and put in store, and shall apply to Mr. Gandasequi, the Spanish agent, to have them supplied with new ones; and fresh hammocks, &c. will be ordered out of store; and we shall write to Mr. Lulman, to make the necessary application to the military to assist in the carrying these directions into execution, should the prisoners,

P 2 notwith-

notwithstanding what may have been urged and explained to them by Mr. Curtis, continue to resist the means used for their safety.

Dr. Lind having so lately been at Winchester, on account of the sickness prevailing there, we were very much concerned upon the return of the two members of our board, who lately went to Winchester, to learn that the wards of the hospital were so crowded. As the necessity of enlarging it was so obvious, and the doing it so easy, we wrote, by the post of the very day they returned, to the agent and surgeon, to employ such wards in the prison as lay nearest to the hospital, and were most separate from the other prison-wards, as an addition to the hospital, and gave them other proper directions upon the point.

We shall renew our standing orders, for the prisoners being inspected in the prison-wards every day, to see who are objects for the hospital.

We

We were happy to be informed, that the wards of the prison and hospital were found clean, and make no doubt the different nuisances complained of, arising from drains and soil-pits, will be speedily removed; and it is with great satisfaction we flatter ourselves, that the various means proposed to be used under your direction, to subdue the infection, will soon prove successful.

We beg to know your opinion, together with Mr. Lulman's, whether, upon the present view of things, the project of encamping the well prisoners, to which it had appeared to yourself, as well as to us, that it might be necessary to have recourse, may not now be dropt; as that of applying the Magdalen house as an hospital very properly is, for the reasons which have been explained to us.

We shall give directions for completing the shed you mention, and every other means you shall think necessary for the

great end of restoring health to the prisoners, you may be assured will meet with our most ready concurrence. We are, with the greatest truth and regard,

S I R,

Your most obedient, and

most humble servants,

J. BELL,

WALTER FARQUHARSON.

Office for sick and wounded Seamen,
the 6th June, 1780.

S I R,

MR. James Parsons, of Stratford, having desired us to permit trial to be made of the efficacy of oil and tar, to be used in the prison at Winchester, as also an acid water drawn from tar to be used in washing
the

the floors of the apartments, we consented to his sending samples, addressed to Mr. Smith, our agent; and we shall be much obliged by your favouring us with your opinion, whether any beneficial effects may reasonably be hoped for, from the use of it; and, in that case, we would order a proper quantity to be forwarded, without the least loss of time. We are,

S I R,

Your most obedient,

humble servants,

J. BELL,

WALTER FARQUHARSON,

VIN. CORBETT.

Office for sick and wounded Seamen,
the 9th June, 1780.

S I R,

WE were extremely glad to receive confirmation, by your letter of to-day, of the good account we had from Mr. Lulman respecting your state of health.

We troubled you for your opinion respecting the oil and acid water of tar, because it had been mentioned to us, in a manner that seemed to justify a trial of it; but we are now confirmed in the opinion we before had of it, and that much more is to be hoped for, from the other means that are using.

It is extremely painful to us to learn, that your endeavours at Winchester are not seconded by every attention in our officers; and we have wrote to Mr. Lulman, to enquire who is particularly culpable, in suffering dirty cradles and beds to be put
into

into the new sick wards, that the notice such a negligent discharge of their duty requires, may be taken of them.

We are very glad to observe you have hopes of a sensible alteration shortly for the better, among the prisoners at Winchester, and sincerely wish it may answer the endeavours of yourself, and Mr. Lulman. We are,

S I R,

Your most obedient,

humble servants,

J. BELL,

WALTER FARQUHARSON.

A private

*A private Letter from Mr. Commissioner
Lulman.*

Winchester, July 18, 1780.

DEAR SIR,

I sincerely hope, by this time, you have recovered from the disagreeable situation in which you left Winchester; in the knowledge of which, none of your friends will more heartily rejoice.

On the evening of the day you left me, I received a letter from the Board, requesting me to stay till the hospital alterations were entirely executed: on Tuesday every thing will be finished, and on Wednesday morning shall leave Winchester. I shall, with great pleasure, take the earliest opportunity of waiting upon you. The number of deaths last week, are reduced to twelve; and the good success attending the methods you have ordered, becomes every

every day more visible, and will, I make no doubt, end both to your credit and satisfaction.

I hope you have found Mrs. Smyth well; to whom, I beg you will present my best respects.

Enclosed I have sent a letter, which arrived here on Friday. I am,

DEAR SIR,

With the greatest esteem,

Your sincere friend,

and humble servant,

R. LULMAN.

Reso-

every day more visible, and will, I make
no doubt, end both to your credit and
satisfaction.

I hope you have found Mrs. Smith well;
to whom, I beg you will present my best
respects.

Enclosed I have sent a letter, which
arrived here on Friday. I am,

DEAR SIR,

With the greatest effort
that the disease which has visited in the
Prison at Winchester originated with the
Spanish prisoners, and humblest
of an infection brought on those with them
when first landed, supposed to be
traced by the length of their confinement
on board of ship in the winter last, and
in great measure by their own neglect, and
want of cleanliness. I have the honor
to acknowledge the report to the Committee
that the disease is a contagious malarial
fever.

*Resolutions of the House of Commons, upon
the Report made from the Committee, ap-
pointed to enquire into the State of the
Health of the Prisoners, confined in the
King's House, at Winchester; and the
Proceedings of the House thereupon.*

Resolved,

THAT it appears to this Committee, that the disorder which has reigned in the Prison at Winchester originated with the Spanish prisoners, and was the consequence of an infection brought on shore with them when first landed; supposed to be contracted by the length of their confinement on board of ship in the winter season, and in great measure by their own indolence, and want of cleanliness.

Resolved,

That it appears to this Committee, that the distemper is a contagious malignant

nant fever, of the gaol kind, but not a pestilence; the contagion having never communicated itself to the inhabitants of the town, though several of the attendants of the hospital, who were seized with it, were brought into the town, and died there.

Resolved,

That it appears to this Committee, that the disorder is not only greatly decreased, but from the wise and prudent regulations that have been taken, bids fair to be soon totally extinguished.

Resolved,

That it is the opinion of this Committee, that the Commissioners of sick and wounded have exerted themselves to the utmost, and been highly meritorious, in taking every measure that could be suggested to stop the progress of so great a calamity.

Resolved,

Resolved,

That it is the opinion of this Committee, that by the skill and ability of, and the measures pursued by, Doctor James Carmichael Smyth, physician of the Middlesex hospital (whom the Commissioners of sick and wounded procured to go to Winchester upon this occasion) the violence of the distemper reigning among the prisoners there was first checked, and has been in a state of decrease ever since; the number of the sick in the hospital being reduced upwards of one hundred, and the burials in the two last weeks having amounted only to five in each.

The said Resolutions being read a second time, were agreed to by the House.

Resolved, nemine contradicente,

That an humble address be presented to His Majesty, that He will be graciously pleased to take the merits of the said Doctor James Carmichael Smyth into His
royal

royal consideration, and to confer upon him such mark of His Majesty's favour, as His Majesty in His royal goodness may think fit.

Ordered,

That the said address be presented to His Majesty by such members of this House as are of His Majesty's most honourable Privy Council.

Ordered,

That the said Report, with the Appendix thereunto, and the Proceedings of the House thereupon, be printed.

APPEN-

A P P E N D I X.

Office for sick and wounded Seamen, &c.

A Weekly progressive State of the Sickness and Mortality among the Spanish Prisoners, confined in the King's House, at Winchester, from the first Appearance of the Jail Distemper, until the 8th of July 1780.

Date of Weekly Accounts.	Number of Spanish Prisoners.		
	In Custody.	Sick.	Dead.
March 26, 1780 -	1247	60	1
April 2, —	1243	106	4
9, —	1475	150	10
16, —	1457	172	18
23, —	1433	142	21
30, —	1412	171	21
May 7, —	1388	191	25
14, —	1351	197	27
21, —	1523	205	30
28, —	1494	226	31
* June 3, —	1461	262	33
10, —	1437	212	26
17, —	1426	173	9
24, —	1420	167	5
July 1, —	1414	143	5
8, —	1433	122	2

* The time of Dr. Carmichael Smyth's going to Winchester.

APPENDIX

A Weekly paper giving state of the Sick and
 Mortality among the Spanish Prisoners con-
 fined in the King's Hospital at Winchester,
 from the first Appearance of the Fall of
 temper, until the end of Feb. 1780.

Weekly Accounts.	Date of	Number of Spanish Prisoners.		
		In	Sick	Dead
March 20, 1780	—	1447	60	1
April 2, —	—	1443	106	4
9, —	—	1472	120	10
16, —	—	1457	132	18
23, —	—	1473	142	21
30, —	—	1412	171	21
May 7, —	—	1388	191	23
14, —	—	1351	197	27
21, —	—	1323	202	30
28, —	—	1404	226	37
June 3, —	—	1461	262	37
10, —	—	1417	212	20
17, —	—	1420	173	9
24, —	—	1420	167	2
July 1, —	—	1414	143	2
8, —	—	1402	122	2

* The time of Dr. Carstalled Ship's going to Winchester.

*Memorial presented to the Right Honourable
Lord North, &c. &c. &c.*

*As the present publication may possibly fall into
the hands of some persons, whose friendship
leads them to take an interest in every thing
which respects the author, on their account
the following Memorial is inserted. Others
may consider it as so many blank pages,
which have not increased the expence, and
have added little to the size, of the volume.*

(C O P Y.)

To the Right Honourable Lord North,
&c. &c. &c.

THE MEMORIAL OF
DOCTOR JAMES CARMICHAEL SMYTH.

YOUR memorialist feels a satisfaction
which no emolument can yield, in the very
honourable mark of distinction he has re-

Q 2

ceived

ceived from the House of Commons, by their address to His Majesty in his favour; he entertains likewise the most grateful sense of the countenance your Lordship was so kind as to give it in the House, and is thereby encouraged to hope that you will have the goodness to support it, by your favourable recommendation to the King.

To enable your Lordship to do this with the greater propriety and force, your memorialist has taken the liberty, briefly, to state to you some of the principal circumstances relative to his conduct, and services, at Winchester.

In the first place, he thinks it necessary to observe to your Lordship, that previous to his going there, the sickness and mortality were daily increasing; and, notwithstanding the advice, and for some time the attendance, of two physicians of eminence, had arisen to an alarming height.

The number of deaths exceeded thirty a week, and the number of sick in the hospital,

hospital, which amounted on the first of June to about two hundred and twenty, increased in four or five days after to two hundred and seventy-eight; and, considering that the hospital was already too crowded, there is great reason to conclude, that had not an immediate and effectual check been given to the distemper, the mortality would have increased in proportion to the sickness.

That the measures pursued by your memorialist were of efficacy in abating the contagion, is evident from the great and sudden decrease in the *hospital list*, which, in ten days time, was reduced one hundred and five; and that these measures, if fully carried into execution, would have entirely destroyed the contagion, is at least extremely probable, as none of those Spaniards who were washed in the river, new clothed, and lodged in the purified prison wards, were seized with the distemper during the time that your memorialist remained at Winchester.

By an unfortunate mistake between Mr. Gandasequi the Spanish agent, and his deputy, there were only three hundred suits of clothes issued; a number by no means sufficient to make the change required for the purification of fifteen hundred men.

Nor was it possible (however necessary) without compulsion, to take from the Spaniards all their old clothes and bedding, which are known to retain so powerfully the seeds of contagion.

That the enlarging the hospital, the new arrangements made, and the directions given by your memorialist, for the treatment of the sick, were attended with the happiest consequences is clearly proved, from the alteration in the weekly returns: the number of deaths the week after these regulations took place were reduced to nine; the two following weeks to five in each, and this last week to two.

Respecting

Respecting the hospital, it is perhaps proper to inform your Lordship, that the sick were attended by some of their fellow prisoners, who, as their services were voluntary, could not be punished for neglect of duty; nor could they be induced by promises or rewards to pay that strict attention to cleanliness, and to the regular administering of medicines, so necessary in cases of this kind.

It should also be known to your Lordship, that the prisoners, from an aversion to go into the hospital, frequently concealed their indisposition till it was out of the reach of medical assistance.

Your memorialist begs leave further to represent to your Lordship, that, in two instances, he was the occasion of a very considerable saving to government.

In the first place, by fitting up, as an additional hospital, a part of the prison adjoining to it, and at the same time, by lessening the number of the sick, he prevented the

Q₄

necessity

necessity of hiring and fitting up the Magdalen house; a measure, which was almost concluded on by the Board for sick and hurt, but which, if adopted, must have cost a very considerable sum of money.

Secondly, He prevented the expence of encamping the prisoners on the airing ground, which was looked upon, at the time he left London, as the only expedient for abating the contagion remaining untried; and application was accordingly made, by the Commissioners, to the Lords of the Admiralty, for orders to that effect.

Your memorialist flatters himself, that he will stand excused to your Lordship if, as an additional claim to your protection and support, he should presume, before concluding this memorial, to mention some circumstances relating only to himself.

Your memorialist is persuaded, that the Commissioners for sick and hurt will do him the justice to say, that he went to
Winchester

Winchester upon application being made to him by that Board, without stipulating for any pecuniary gratification ; and he can with truth affirm, that no pecuniary reward could have induced him, at that time, to have left his family, and quitted his business, to engage in so hazardous an enterprise. He was fully apprized of the danger and difficulty attending it ; he knew that others, who had been applied to, had declined it from considerations of private interest, or of personal danger ; he knew that he was to risk not only his professional character, but his life, in the attempt, as most of the officers and servants belonging to the hospital, and prison, had fallen victims to this fatal distemper.

Your memorialist soon experienced, that the reports of the contagious nature of the disease were not exaggerated, nor the apprehensions of danger imaginary : the fourth day after his arrival at Winchester, he was seized in a very violent manner with the
fever ;

fever; but neither this unfortunate accident, nor the situation of his family in town, left unprotected in the midst of flames and riots, could turn him aside from the line of his duty, nor force him to quit an undertaking, in which he felt the interests of humanity, as well as the national honour, so deeply concerned; even when unable to hold the pen, and during the intervals of the operation of a violent emetic, he continued to dictate instructions for the surgeon, and regulations for the management of the hospital; being apprehensive lest the fever, by seizing his head, might soon render him incapable of doing this.

Your memorialist, the night before he left Winchester, suffered another very violent attack of the distemper, which, after his return to town, confined him to his bed for several days, and left him in a state of weakness, from which he has not as yet perfectly recovered.

But these, my Lord, are only the sufferings of an individual, which are commonly forgotten as soon as the purpose is served ; your memorialist, however, is not afraid of this being the case in the present instance ; his endeavours to serve his country have been attended with a success which even his friends could hardly expect, and which he believes stands without example in the annals of physic. He has already received from the public the fullest approbation of his conduct, and makes no doubt that, in consequence of your Lordship's favourable representation of it to the King, he shall receive from His Majesty (ever attentive to reward merit in the lowest of His subjects) some mark of His Majesty's royal favour *.

* His Majesty, some time after, was graciously pleased to appoint the memorialist one of his physicians extraordinary.

The following *Formulæ of Medicines* are not given to the public as specimens of elegance, or of accuracy in composition; they were written in haste for the occasion, and are only now published as constituting a necessary part of the practice in the hospital at Winchester.

Formulae Medicamentorum, in usum Nosocomii Wincesterensis, conscriptæ.

1. *Mistura emetica.*

R. Tart. emet. gr viij.

Aq. puræ distillat. ℥ viij M.

Dosis coch. ij ad iv. fing. horæ 4tibus
donec evomuerit æger.

2. *Pulvis antimonialis.*

R. Tart. emet. gr ij.

Calc. antim. illot.

Test. ostreor. pp. aā ʒ j tere
probe simul ut f. pulvis.

Dosis gr vij. ad gr xij.

3. *Bolus antimonialis.*

R. Pulv. antim. gr vij ad xij.

Conserv. cynosb. ʒ j M.

4. *Bolus*

4. *Bolus antimonialis cardiac.*

R. Pulv. antim. gr vij ad xij.

Confect. cardiac ʒj ad ʒfs M.

5. *Bolus antim. cum philon.*

R. pulv. antim. gr viij.

Philon. Lond. gr xv. M.

6. *Bolus antim. laxans.*

R. Pulv. antim. gr x.

Electar. lenitiv. ʒfs M.

7. *Julep menth. vitriol.*

R. Aq. menth. lbj.

Spirit. vitriol. dulc. ʒij.

Sacch. alb. ʒfs M.

Dosis ʒij 4tis vel 6tis horis.

8. *Julep e camph. c.*

R. Julep e camph. Ph. Lond. P ij.

Sp. Minder. Ph. Ed. P i M.

Dosis ʒij 4tis vel 6tis horis.

9. *Bolus peruvianus.*

R. Cort. peruv. pulv. ʒfs ad ʒij.

Syrup croci. q. s. M.

10. *Bolus*

10. *Bolus peruv. card.*
 R. Cort. peruv. pulv. 3 fs.
 Confect. card. 3j.
 Syrup croci. q. f. M.
11. *Bolus peruv. volat.*
 R. Bolum peruv.
 Sal. volat. C. C. gr vij. ad xv M.
12. *Bolus peruv. acid.*
 R. Bolum peruv.
 Elix. vitriol Mynsicht. gutt. xij ad
 xx. M.
13. *Bolus e moscho.*
 R. Mosch. pulv. 3j.
 Conserv. cynosb. q. f. M.
14. *Bolus e mosch. card.*
 R. Mosch. pulv. gr xij ad 3j.
 Confect. card gr. xv M.
15. *Botus e mosch. volat.*
 R. Bolum e mosch.
 Sal. volat. C. C. gr x ad xv M.
16. *Haustus*

16. *Haustus peruvianus.*

R. Decoct. cort. peruv. \bar{z} i fs.

Tinct. — Huxh. \bar{z} fs.

Pulv. — \bar{z} j ad \bar{z} fs. M.

17. *Haust. peruv. c. opio.*

R. Haust. peruv.

Tinct. thebaic. gutt. v ad xij. M.

18. *Haust. peruv. card.*

R. Haust. peruv. sine pulv. cort.

Confect. cardiac. \bar{z} j M.

19. *Haustum peruv. anod.*

R. Haust. peruv.

Liq. anod. min. Hoffm. gutt. xx. M.

20. *Haust. peruv. c. acido.*

R. Haust. peruv.

Elix. vitriol. M. gutt. xij ad xx. M.

21. *Haustus laxans.*

R. Infus. sen. com. \bar{z} i fs.

Tinct. jalap \bar{z} j.

Mannæ.

Sal. cathart. amar. āā \bar{z} ij M.

22. *Electarium*

22. *Electarium laxans.*

R. Electar lenitiv. ℥ i fs.

Sal. nitri ℥ fs.

Rad. jalap. pulv. ℥ ij. M.

Dosis magn. N. M. pro re nata.

23. *Enema laxans.*

R. Decoct. malvæ ℥ xiv.

Sal. nitri ℥ i.

— cathart. amar. ℥ fs. M.

22. *Electronium laevigatum*.
 R. P. Farlow. 1876.
 23. *Electronium laevigatum*.
 R. P. Farlow. 1876.
 24. *Electronium laevigatum*.
 R. P. Farlow. 1876.
 25. *Electronium laevigatum*.
 R. P. Farlow. 1876.

26. *Electronium laevigatum*.
 R. P. Farlow. 1876.
 27. *Electronium laevigatum*.
 R. P. Farlow. 1876.
 28. *Electronium laevigatum*.
 R. P. Farlow. 1876.

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