

A second dissertation on fever : containing the history and method of treatment of a regular tertian intermittent.

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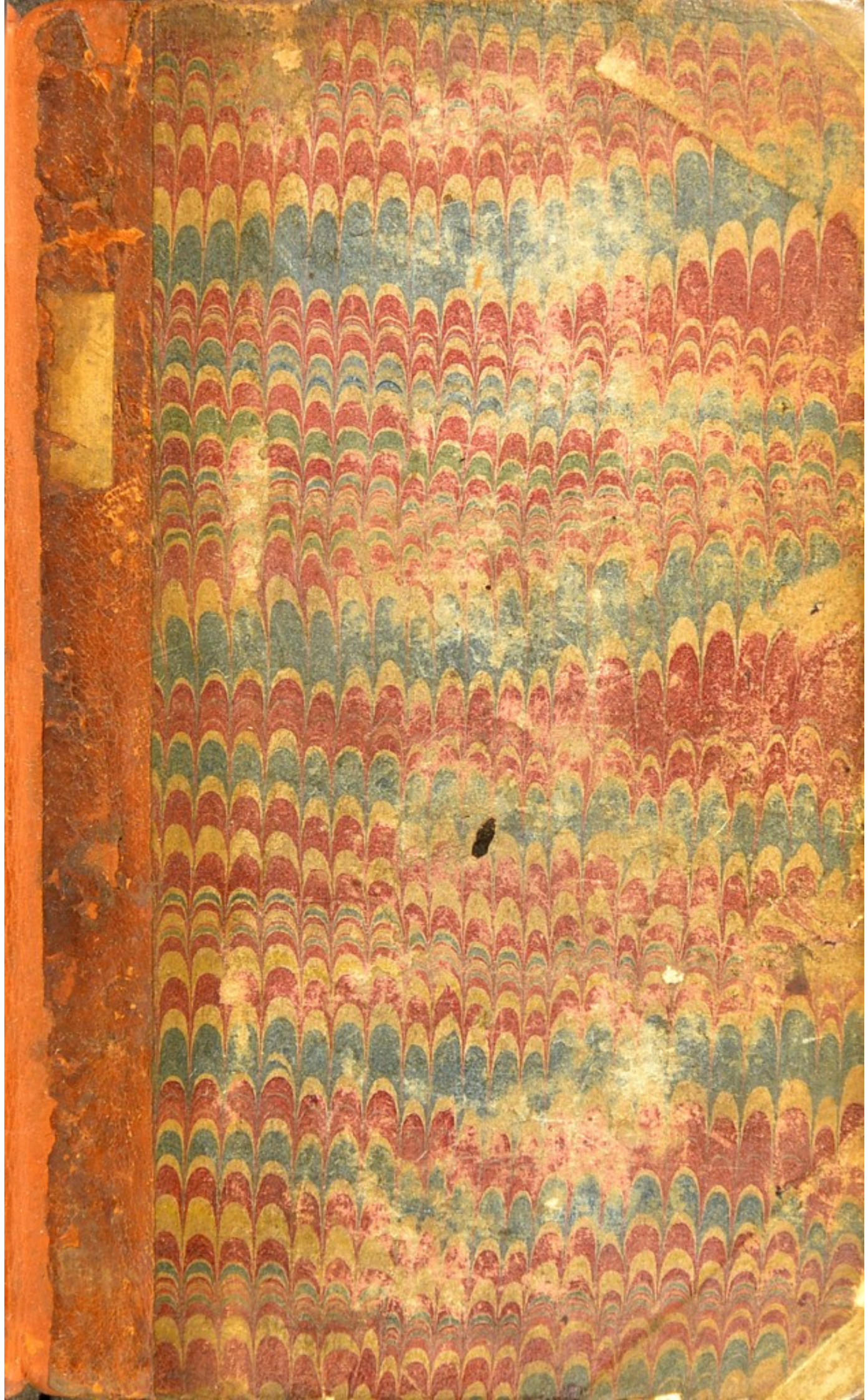
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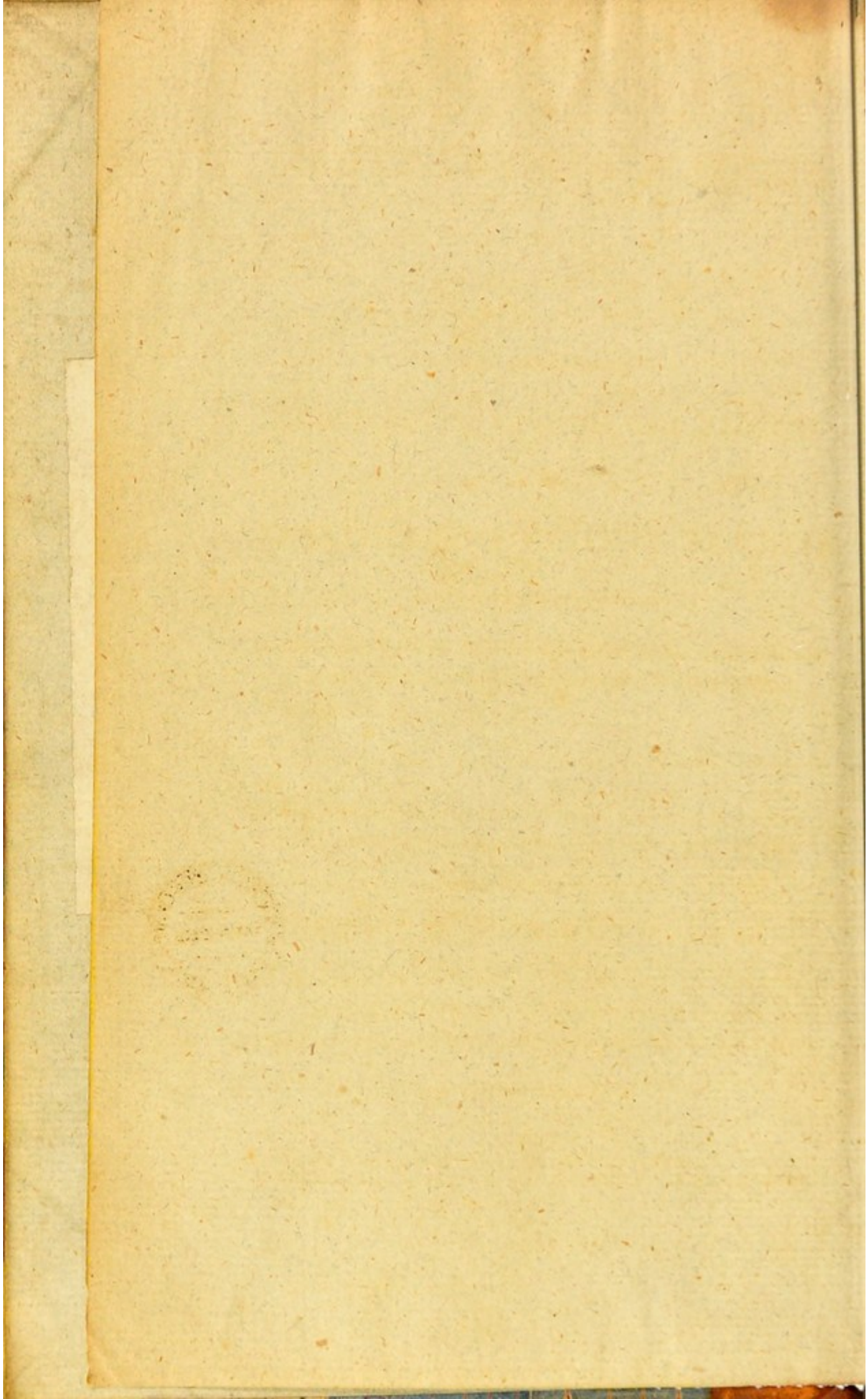
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SECOND DISSERTATION

ON

F E V E R ;

CONTAINING THE

HISTORY AND METHOD OF TREATMENT

OF A

REGULAR TERTIAN INTERMITTENT.

Medicina igitur adhuc taliter comparata est, ut fuerit magis ostenta, quam elaborata: etiam magis elaborata quam amplificata.

BACON AUG. Sc. Lib. ii. Cap. i.

Solent autem homines naturam tanquam ex præalta turri et e longo despicere, et circa generalia nimium occupari; quando si descendere placuerit et ad particularia accedere, resque ipsas attentius et diligentius inspicere, magis vera et utilis fieret comprehensio.—IBID.

By GEORGE FORDYCE, M.D. F.R.S.

FELLOW OF THE ROYAL COLLEGE OF PHYSICIANS,
SENIOR PHYSICIAN TO ST. THOMAS'S HOSPITAL,
AND READER ON THE PRACTICE OF PHYSIC IN LONDON.

LONDON:

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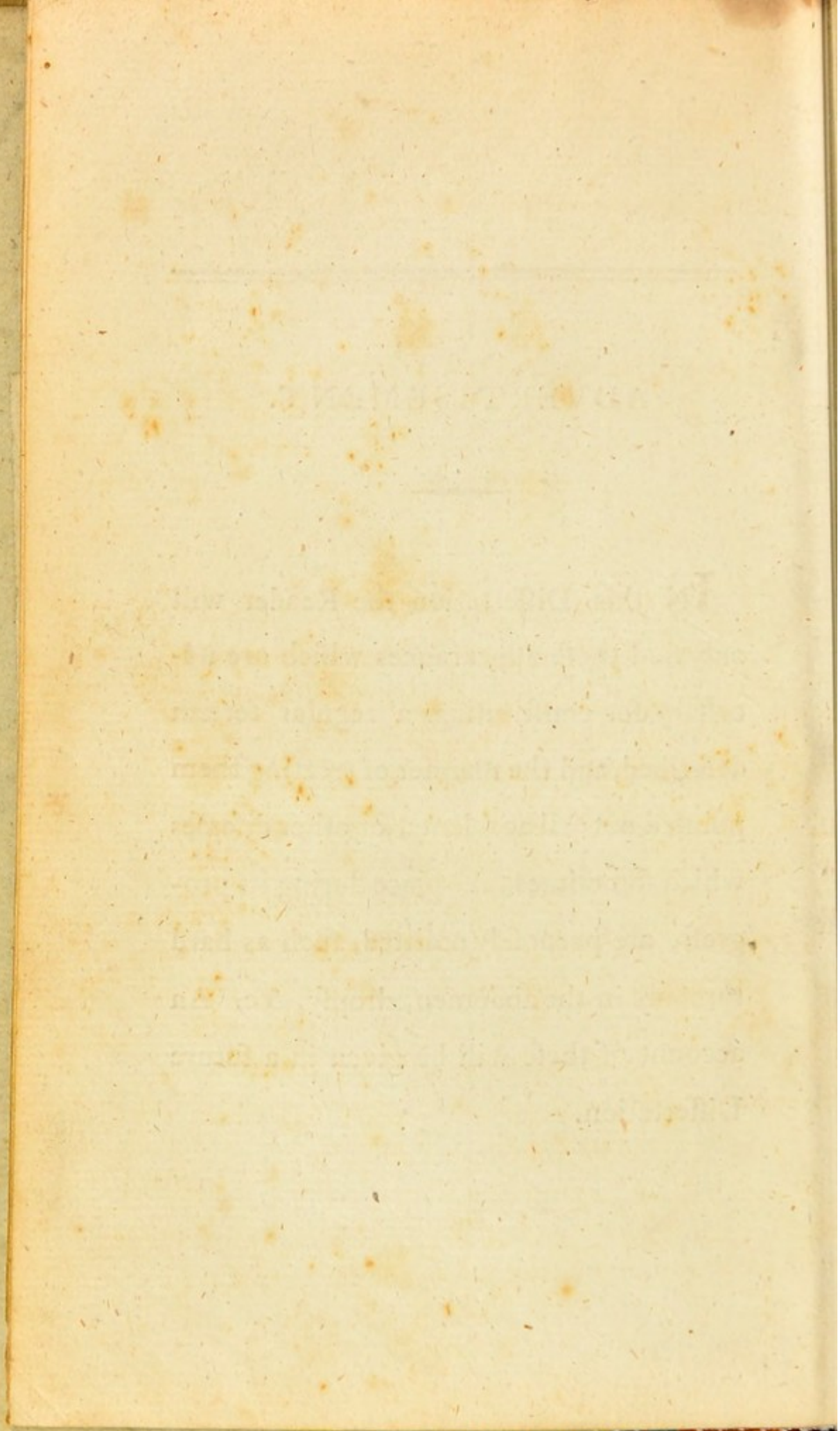
1802.



By J. CROWDER and E. MEMSTED, Warwick Square.

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IN this Dissertation the Reader will only find those appearances which are necessary for constituting a regular tertian described, and the manner of treating them pointed out; all accidents, or other diseases which sometimes take place during its progress, are purposely omitted, such as hard tumours in the abdomen, dropfy, &c. An account of these will be given in a future Dissertation.



SECOND DISSERTATION, &c.

THE history of a fever consisting of one paroxysm, or simple fever, has been given in the Dissertation already published. The author, in pursuance of his plan, means next to treat of that case of fever recurring by paroxysms, in which each paroxysm goes through its three stages in the space of less than twenty hours, and returns nearly at the end of forty-eight hours from the beginning of the former paroxysm; and where nothing happens excepting those appearances, which are essential to the fever. A fever of this kind is called a regular tertian.

If a person has never been before affected with an intermitting fever, and a paroxysm

of simple fever should take place, and should terminate in a complete crisis, so that no symptom of the fever is left; the patient is restored to perfect health, and the fever does not recur, as far as has come under the author's observation or information. The person is likewise not more liable to be affected with fever from any new cause than if no such paroxysm had taken place.

When a person is seized with a paroxysm of fever, it frequently goes through its stages and terminates by a crisis in ten or twelve hours, but there are left behind symptoms of the first stage, such as languor, pain in the small of the back, head-ach, some foulness of the tongue, &c. When this happens, sometimes, though rarely, these symptoms gradually diminish and go off, and the patient recovers his health in three or four days. It much oftener happens, when symptoms of the first stage remain after the crisis, at least nine times out of ten, that after a certain length of time a new paroxysm of fever takes place, and often at the end of forty-eight hours, and the disease becomes a regular tertian.

When

When a person is exposed to putrid or infectious vapour, head-ach, languor, and restlessness, or other symptoms of the first stage of fever often take place, but not to that degree as to occasion a hot fit, or second stage. These sometimes gradually wear off, and no fever arises; but they also very often increase all at once, and a complete paroxysm takes place several days after the first appearance of these symptoms. From these observations it is very probable that one cause of the return of the second paroxysm of an intermittent is, that the crisis of the first was imperfect.

If a regular tertian has gone through many paroxysms, and in any one paroxysm the crisis is quite complete, it sometimes happens that the disease does not recur: but the paroxysm returns much more frequently, although there are none of the symptoms of the first stage left, or of any part of the fever.

If a person has formerly been afflicted with a tertian fever, although he has con-

tinued in health for a year, yet if a fever should take place, go through its stages in twelve hours, and no appearance of it continue, but the patient feels himself in perfect health, a new paroxysm of fever shall often take place at the end of forty-eight hours from the beginning of the first paroxysm. In this case the cause of the return is probably a habit acquired, as we see circumstances often recur, because they recurred before. A man, for instance, has been accustomed to dine at a certain hour, his appetite returns at that hour, if he eats nothing the appetite nevertheless goes off.

When a paroxysm of fever goes off, leaving some symptoms of the first stage after the crisis, it oftener returns at the beginning of the forty-ninth hour from the beginning of the former paroxysm than at any other period.

Much conjecture has been made on the reason why a paroxysm of fever should arise at the end of the forty-eighth, or beginning of the forty-ninth hour. No revolution of the heavenly bodies accords with this

this period, nor any operation in the body itself. We are left here therefore, as in most other cases of fever, mere observers, without a means of accounting a priori for its appearances.

In some cases a paroxysm returns, and fresh paroxysms continue returning at the beginning of the forty-ninth hour exactly, so as to form a tertian perfectly regular. Paroxysms of fever, it has been observed in the former Dissertation, commence much more frequently from eight o'clock in the morning to eight in the evening, than from the evening to the morning. The paroxysms of a regular tertian follow one another at the time of the day of the coming on of the first paroxysm, so that they continue recurring at the time of the day when the first paroxysm took place. Some have supposed that the sun's passage over the meridian was connected with this return; but the sun's passage is by no means constantly at the same hour, as it varies from mean time from a quarter of an hour earlier to a quarter of an hour later, and this difference has never been ob-

ferred to occasion the least alteration in the returns of a regular tertian. The paroxysms do not take place more frequently at noon than at any other time, between eight in the morning and six in the evening. One that takes place at ten in the morning or three in the afternoon, cannot be connected with the sun's passage over the meridian. The sun passes it once in twenty-four hours, a regular tertian recurs but once in forty-eight. Should a person afflicted with a tertian travel east or west, the sun's passage will be accelerated or retarded, but the paroxysm will return exactly at its usual period. It is evident therefore that the sun cannot have any effect in reproducing the paroxysms of a regular tertian. Neither can the phases of the moon, or other planetary bodies, since their variations are infinitely greater.

Although intermitting fevers return more frequently at the end of forty-eight hours, than at any other period, so as to form regular tertians, yet they are not uniformly so exact, having often a latitude of two hours,

hours, sooner or later ; that is, from forty-six to fifty hours.

Twenty fevers at least return at a period between forty-six and fifty hours, for one which recurs in a period from thirty-six to forty ; or at any other period, excepting at the end of twenty-four or seventy-two hours.

When a paroxysm of fever does not return exactly at the end of forty-eight hours, it often happens that one paroxysm recurs at the end of forty-nine, the other at the end perhaps of forty-seven hours, thus continuing to fluctuate backwards and forwards about the forty-eighth hour, never going two hours from it. For example, the first paroxysm may take place at ten o'clock on Monday morning, the second at eleven on Wednesday, the third, perhaps, at half past eight on Friday, the fourth at ten on Sunday, and so may take place between eight and twelve in the morning during the continuance of the disease. These fevers have all been considered by those who have treated on

the subject, as taking place at the same period.

It sometimes happens that a fever continues to return at the end of forty-six or of fifty hours; the former has been called an anticipating tertian; those fevers the period of which is fifty hours, retarding tertians; or those generally which return at any time between forty-six and forty-eight hours have been called anticipating; those which return from forty-eight to fifty hours retarding tertians.

An anticipating tertian shows in one circumstance the strong indisposition of a fever to take place between eight at night and six in the morning. If an anticipating tertian should have its first paroxysm at two in the afternoon, its second at noon, its third at ten in the morning, its fourth at eight, its fifth will sometimes take place at six in the morning, sometimes at eight or ten of the evening preceding. A retarding fever is similar in its recurrence; if its first paroxysm should happen at ten in the morning,

morning, the succeeding ones at twelve, two, four, six, eight; the following one often does not take place in the night, but at six or eight the next morning. It is not meant to say that the paroxysms never return regularly in the night, but that they recur much more rarely in the night than in the day; perhaps in a proportion of ten for one. It is entirely unknown what this depends upon, indeed the observation has been little attended to by any author who has not frequently seen the disease.

The paroxysm in a regular tertian is exactly similar to the paroxysm of a simple fever, the only difference being that in a tertian the crises of the first paroxysms are not so compleat as to carry off every appearance of the first stage.

The symptoms of the first stage that remain after the crisis are various in different cases; sometimes the only appearances of it are languor and pain of the small of the back, so that the practitioner, even if accustomed to the disease, hardly knows whether the paroxysm will return or not.

Although

Although the tongue has become perfectly clean, the pulse returned to its natural state, and the patient is apparently in perfect health, excepting for the languor and pain in the small of the back, the disease almost always returns. This languor must not be confounded with the fatigue arising from the paroxysm of a simple fever which goes off. In a simple fever the patient falls asleep either during the crisis, or immediately after it has gone off, sleeps for two, three, or five hours, if it should not happen to be the natural time of his rest, or during the night if it should, and wakes refreshed and in perfect health; or if he should not sleep the fatigue of the paroxysm goes off in six or eight hours. But if after this sleep or time of rest, languor and pain in the small of the back continue, the disease almost certainly recurs.

Sometimes remains of the first paroxysm are much more considerable; the depression of strength is greater; there is perhaps no pain in the small of the back, but there is often pain in the forehead; the tongue continues covered with a crust, perhaps not universally,

universally, there being only a little towards the middle or back part of it; the pulse is not uncommonly left with a degree of frequency beyond the natural state; the skin, after the sweating is over, feels dry and uneasy. Sometimes other symptoms of the first stage remain, even when there is a regular crisis. There are all the varieties in the beginning of the disease between the crisis being not completed before the next paroxysm takes place, and there being only some degree of languor and pain in the small of the back.

When there is a regular tertian, in which several symptoms of the first stage remain after the crisis at the beginning of the disease, as it goes on, the intermissions become gradually more and more perfect; or rather the crisis becomes more and more perfect. This happens, with considerable variety. When in the first crisis of the disease there is only languor left and a pain in the small of the back, frequently the next crisis is by no means so perfect, but head-ach, foulness of the tongue, and frequency of the pulse remain after it; even the next
crisis

crisis may be still more imperfect, after that the crises become again gradually more complete.

It happens not uncommonly, that there is no crisis after the first attack of the fever, but a second attack takes place before the first paroxysm is much diminished, so that the disease at first puts on the appearance of a continued fever. In this case, the subsequent attacks are often in the fore part of the day, or if they should come on at the time of the ordinary returns of a continued fever, which are in the evening, they observe the tertian type; in either of which cases, we may expect in a tertian period or two, first an imperfect crisis, followed gradually by more perfect ones, till all the crises are at last complete. When the crises are very imperfect at first, they almost always grow gradually more perfect, until it oftens happens, that they become so perfect, as not to leave behind the least vestige of the disease. That is, during the interval of the paroxysms, the appetite returns with the vigour it would have done in health, digestion

digestion goes on, sleep takes place at the usual period and with the wonted degree of refreshment, the head is clear, and the patient is as capable of managing his affairs as when in his best state; is as capable of bodily exercise; and if he commits any irregularity, such as drinking too large a quantity of wine, or eating food of too difficult digestion, provided the effects are gone off before the next paroxysm takes place they produce no greater derangement than they would in perfect health. This happens only when the tertian is completely regular. Many practitioners have been in situations where they may never have seen a perfectly regular tertian, while others may have seen many hundreds.

These perfect intermissions continue some length of time. Perhaps the intermissions may become quite perfect at the end of three weeks, and continue so for about six weeks, or two months. If they are perfect, and if the patient be managed properly, no debility in the system will take place.*

* It is wished to keep this Dissertation strictly to the regular disease, as treatises upon it have been generally confuted by the introduction of anomalous appearances.

After this period the intermissions become again more imperfect. That is, the sweating in the crisis is not so profuse, there is not much lateritious sediment in the urine, the bowels do not return so much to their natural state; a degree of languor, want of appetite, and imperfect sleep take place. But on the other hand, the attack is much less severe; that is, if in the former paroxysms there were languor and feel of coldness, head-ach, or delirium, these symptoms are diminished: if nausea and vomiting, the vomiting ceases and there is but little nausea. The patient is by no means so much fatigued after the paroxysm is gone off, and thus the disease gradually abates for the space of two, three, or from that to six weeks, at last leaving the patient entirely, but for the most part weakened. He has less power of exerting the faculties of his mind, and of going through bodily exercise, is subject to flatulency, incapable of digesting perfectly his food. These consequences go off after some time, and he often becomes more vigorous even than before the disease took place. The whole therefore of
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the disease occupies about four months naturally.

During this progress of a very regular tertian, it sometimes happens, although rarely, that at any time of the disease, the patient is seized with a much more violent paroxysm; he is attacked with a considerably greater degree of cold, more violent head-ach, greater foulness of the tongue, dryness, and parchedness of the skin, sickness and delirium. This is followed by more profuse sweating, all the other critical symptoms take place more perfectly, and no future paroxysm arises. This occurs much more rarely in a regular tertian than when there are irregular appearances.

It has been often observed, that regular tertians clear the constitution of all other diseases, and certainly on a good foundation. If a person, for instance, from twenty-five to forty years of age, should be afflicted with rheumatism, which is become habitual,

tual, and a regular tertian should take place, after it has gone through its course the rheumatism no longer recurs on the same exposure to cold or moisture, as it would have done if no such disease had taken place.

If a person has been subject to indigestion, flatulency, or disposition to acidity in the stomach and intestines, after the tertian has gone through its natural progress, these appearances in the intestinal canal no longer take place. Sometimes, habitual inflammation, or cutaneous eruptions, leave the patient during the course of a regular tertian, and do not afterwards return, although this more rarely happens than in other habitual diseases. So epilepsy, hysteric affection, and all other diseases which have become habitual, are in many instances removed. In many of these cases, however, no alteration is made by a tertian, and it likewise happens, that such diseases are alleviated, although not entirely carried off.

It must be remembered, that we are acquainted with every thing relative to matter,
only

only by experiment, whether animate or inanimate. Yet Hippocrates, his great commentator Galen, Sydenham, and many others, have asserted that the powers of the heavenly bodies on disease were considerable in regulating its progress and termination, without any proof from experiment or observation. Many have said, that diseases originated from variation in the properties of the blood, or other fluids; this assertion depended so little upon experiment, that Hippocrates, Galen, and Sydenham, with other great practitioners, did not even know that the blood consists of red particles, coagulable lymph, and serum; much less had they examined the variations that take place in it, or the other fluids in a healthy state, during disease, or after its termination. Whatever they have said on this subject is of no authority, more than the terra australis incognita, or any other dream. It is found on the contrary by experiment, that the blood of a man afflicted with a regular tertian seldom differs from that of a man in the most perfect health. This the author has frequently

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ascertained

ascertained by minute examination*. Neither is there any difference in the appearance of any of the solids or fluids of the body, during or after the disease, excepting that the tongue, during the paroxysm of a tertian, is covered with the crust described in the former dissertation; and a lateritious sediment takes place in the urine, in the crisis, which consists of matter found in the urine of a man in health. After a tertian has gone through its regular course, no difference in the blood has been found upon the investigation of its properties, or any of the other fluids, from those found in a state of perfect health.

The Author has therefore never seen nor can himself conceive any cause why a simple paroxysm of fever should go through its three stages, and terminate in health; much less why a regular tertian should begin, grow gradually more perfect, continue for some time in vigour, then gradually decay and go off; nor after so many conjectures which

* The properties of this fluid are related as found by experiment in the Author's Elements of the Practice of Physic.

have

have been thrown away on this subject, does he expect that the cause of this will be known in his time.

The animal and vegetable creations are destined to be continued by succession, not by the permanence of individuals. In man, this law is more perfect than in any other animated being; he grows up from infancy, so as to acquire perfection by degrees, both in his corporal and mental faculties. These continue some years in their greatest perfection, and then necessarily fall into decay, which decay is often rendered premature by disease. It would seem that acts of violence sometimes will restore its vigour. Fever thus, and even other violent diseases, which go on in a similar manner, proceeding through their natural course, often leave the patient free, not only from the disease itself, but also from the decay arisen from some less violent disorder, that had not in itself a natural progress and termination in health. Probably, the manner in which this happens will ever remain inexplicable.

Regular tertians, the paroxysms of which are terminated in less than twelve hours, returning from forty-six to fifty hours, are very rarely fatal in temperate or cold climates. When they destroy, it is by a violent attack of the cold fit, which does not happen once in a thousand cases; or by weakening the patient.

Many practitioners considering how rarely regular tertians are fatal in temperate or cold climates, and that when they have gone through their natural course, patients are left in more perfect health than before their commencement, have thought it better not to risk the application of any remedy which may have a tendency to cure it, lest the disease should be disturbed, and its salutary effects be prevented. There have accordingly been two opinions respecting the treatment of this malady; one, that it should be allowed to go through its natural course; the other, that remedies should be employed to shorten and carry off the disease.

It is meant, first, to enquire into the practice to be pursued, where medicines having a tendency to check the natural period of the disease are not applied; and afterwards, to examine into the effects of those remedies which have been employed to put a stop to, or shorten the period of the disease.

If the practitioner be of opinion that a regular tertian should go through its natural course, his only object must be to avoid during that course every circumstance that can disturb its progress.

With this view enquiry must be made, of what, in the ordinary mode of living, or peculiarities of the climate, or what accidents may disturb the natural course of the disease.

The attention is first drawn towards the employment of proper food, and at proper times, both as it is generally known, that a certain quantity of food excites disorder in a man in health, especially of particular kinds; and as practitioners find the system extremely disordered by exhibiting food in

certain quantities, or of certain qualities during fever.

Were a tertian to consist of two paroxysms only, it might not be necessary to employ any food whatever; but as the disease continues many weeks, sometimes to the end of the fourth month, it is absolutely necessary, that nourishment should be given. For although total abstinence has been practised by the Jews for six days, both from food and drink, and although men have sometimes existed twenty days upon water alone, yet in both cases they have been so excessively reduced, as to shew that forbearance from proper nourishment can never be hazarded for any length of time.

Two things must be attended to in the application of food in a regular tertian: First, the times of the periods of a regular paroxysm, and intermission, in which it should be used. Secondly, the qualities of the substances employed.

It must occur to every practitioner, that the digestion of the food and the paroxysms
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of fever should be entirely gone through at different times, so that the one may not interrupt the other; for it is known from experience, that digestion of the food does not take place so well during the paroxysm of fever, as when no paroxysm is present; and that the paroxysm is itself disturbed by the digestion, prolonged by it, and the crisis rendered more imperfect; it is therefore obvious that the digestion of the food should be kept as distinct as possible from the paroxysm of fever.

In the Treatise on Digestion by the Author, it has been shewn, that it is natural to man to make only one meal in the day, i. e. twenty-four hours, the additional ones are merely the effect of luxury. The time of the principal meal, has been fixed by the habit of various countries and different ages, to almost every part of the day; sometimes even in the night, and that without any great inconvenience. In a tertian of forty-eight hours, there ought to be two of these meals. But as a tertian takes place most frequently between eight in the morning and six in the

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evening,

evening, and as the digestion of food requires eight hours, the paroxysm must interfere on the day in which it takes place, with the accustomed time of the principal meal: for supposing the paroxysm to take place at eight in the morning, it will be at least eight in the evening before it is completely terminated, and supposing the ordinary time of the principal meal eleven in the morning, it would be seven in the evening before the digestion of the food was perfected. If the patient should continue his ordinary habits, there would therefore be only time for one meal in forty-eight hours.

The time at which the patient has been accustomed to eat his principal meal, is the most eligible. At that hour the patient grows hungry by habit, and if it should be passed over without eating, his appetite is lost and in consequence the digestion does not take place so perfectly. This happens more particularly, when it has been usual to observe the time strictly, so that in some persons, nausea, and many disagreeable appearances arise, both from omission of food at
the

the usual time, and from the exhibition of it at any other hour. In such cases, therefore, it is a question whether it should be administered in considerable quantity, only on the intermediate day between the paroxysms, or whether the hour should be altered.

When the patient has not been strictly tied down by habit to one particular hour it is better perhaps to alter the time, and give two principal meals, one so as to be eight hours before the paroxysm begins, the other about sixteen hours after the paroxysm has gone off. But when the time of the principal meal has been nearly defined by habit, as is generally the case, there should be only one principal meal in forty-eight hours, at the usual time of the intermediate day; and smaller quantities of food should be employed during the twenty-four hours, in which the paroxysm takes place, counting from midnight; not however, nearer to the paroxysm than six hours before it comes on, nor solid food sooner than six hours after it has entirely ceased.

The quality of the food to be used is to be considered with relation to the different states of the disease.

When at the beginning of a regular tertian, there are only remissions, or very imperfect intermissions, the tongue being covered with a crust, frequency of the pulse, head-ach, and other symptoms of the first stage remaining after the paroxysm, and during the whole intermission; the food employed should be such as will produce no disturbance in the system during its digestion. If the patient be moderately strong, which generally is the case, very little nourishment is required. In this case too, no principal meal should be given.

Farinaceous matter is the food best adapted to the organs of digestion of the human body. When separated from the other juices of vegetables with which it is united, it is called starch, and in this state becomes less proper for food, as it loses the disposition to enter into the fermentations in the stomach necessary for its conversion into chyle.

chyle. If it be combined with water without coagulation, it forms a viscid and adhesive solution, difficult of digestion; but if coagulated and dissolved in water by boiling, the solution is much less adhesive. When naturally mixed with the juices of vegetables, it enters readily into the saccharine, vinous, and acetous fermentations; but in this case great difference arises from the juices with which it is combined: when found in the roots of plants, such as potatoes, yams, &c. it is more apt to fall into fermentation; is therefore more flatulent and aciscent; qualities that render it improper for the state of a tertian at present treated of. It is less disposed to enter into these fermentations, as it is found in the seeds of the gramina, and is better adapted to this state of the disease.

Of the seeds of the gramina rice contains in an equal bulk a greater quantity of farinaceous matter than any other of the seeds of the gramina. Before it is employed the husk is entirely taken away, which should always be the case with the other farinaceous seeds when given in fever. It is believed that some astringent matter is contained

contained in the feed itself, and certainly it is of less easy digestion than others of the grains which have not the farinaceous matter so firmly compacted. Wheat is abundant in farinaceous matter in the next degree; and millet differs very little from it; rye and barley are rather more prone to fall into the vinous and acetous fermentations; oats and maize contain the farinaceous matter less pure, and have been supposed to stimulate the system during their digestion. These are the feeds of the gramina usually employed in Europe, they all appear proper food in this state of an intermittent, and better adapted to it than any other species of nourishment.

Coagulation of these feeds is indispensably necessary before they are used. It has been done by applying heat to them, alum, alcohol, or some other coagulating substance. In this state of fever, coagulation by heat is alone proper. Heat may be applied so as to coagulate these feeds by breaking them down into gross powder, and exposing them to a heat of 212° . Another mode is, by boiling them a quarter of an hour in water, throwing

throwing the water away as containing parts that might have been dissolved before coagulation, as well as extraneous matter accidentally mixed with it. They may afterwards be dissolved by boiling in water, or used whole.

Another mode has been to form them into thin cakes with water, and expose them to a heat somewhat more than 112° ; but this is to be rejected, as it forms them into too compact a mass, which cannot be easily penetrated by the juices of the stomach.

The gas produced during the fermentation of bread, and expanded by the heat of baking, leaves the whole mass very porous, and therefore easily capable of absorbing the watery juices of the stomach; it also increases the coagulating power of heat. As large masses of a mixture of farinaceous matter and water fermenting are often exposed to a much greater heat than 212° , the interior parts are not sufficiently coagulated, while the outer are beginning to be decomposed or burn. For this reason such masses are often cut into slices and baked a second time, in
order

order to perfect the coagulation. This preparation was called by the antients, panis bifcocta.

In a temperate or cold country, when the patient is strong, and there are only slight remissions at the beginning of an intermit- tent, or it puts on the appearance of a con- tinued fever, excepting that the exacerba- tions do not take place in the evening, it is not necessary to give great nourishment, yet some is absolutely necessary. The Greek physicians appear plainly not to have allowed any food or drink whatever on the first days. This seems improper, for if no watery fluid were exhibited, the pro- portion of fluids in the body would proba- bly be too much diminished by the vapour which flies off from the lungs and other external surfaces of the body, and by the necessary evacuations. Accumulation of sea salt could not take place if neither food nor drink were thrown into the body; but common sal ammoniac and phosphoric ammoniac are continually forming by pro- cesses which seem rather to decompose than to produce blood or the other fluids, and
would

would be accumulated. Yet these might not be detrimental, as water might be formed by the same decomposition, so as to render their solutions equally dilute.

Neither the solids nor fluids of a living body are subject to putrefaction; yet some portion of the fluids or solids, or both, seem to verge so near putrefaction, as to be converted into mucilaginous matters which are constantly washed off by the watery secretions. Were the quantity of water diminished, they might not be carried off, but go still farther on to putrefaction, producing salts and vapours which might be pernicious. On this account it may be necessary to throw watery fluids in this case of the disease into the blood vessels.

When the remissions and intermissions of fever are very imperfect, or when the disease at the beginning puts on the appearance of a continued fever, only that the exacerbations do not take place in the evening, perhaps it is not necessary that much chyle should be formed, because when the intermissions become more perfect, there will be
time

time for food of greater nourishment to be digested, without interfering with the paroxysms of the disease; nourishment might therefore be out of the question at this time of the disease.

One symptom which takes place in this case of fever, is great thirst: a natural disposition therefore to throw a quantity of watery fluid into the stomach. It seems to have been an idea of many physicians that every natural appetite should be resisted, but in disease it is certain, that the natural appetites are often the best guides. It is true there are some exceptions to this, as in the case of difficulty of breathing from inflammation of the lungs, when the patient wishes to be exposed to a blast of air, which in a cold country is certainly noxious, although a free air might be proper in a warm country. The loathing of all kinds of animal food at the beginning of an intermittent, when the intermissions are very imperfect, points out that such food should not be exhibited; and the desire for drink indicates that it is proper. It was said indeed by a Greek physician, that thirst would

would sooner go off if none were employed: Upon trial this is not found to be the case; if no drink is used, the patient is uneasy, much more restless, and the intermissions are longer in becoming perfect. It seems indeed that this was the opinion of but a few, the practice by no means extensive among the ancients, and has hardly ever been adopted by modern practitioners. It may therefore be concluded that some watery fluid should be exhibited.

If the disease does not intermit at first, but is known nevertheless to be the beginning of an intermittent, it is not necessary that the patient should have any thing exhibited that will form chyle or blood, because there will soon come a time in which nourishment can be exhibited without the disturbances arising from the process of chylification interfering with the paroxysm of fever. In this case therefore water alone might be thought sufficient, if the matter were taken *a priori*. When water alone is drunk the thirst is not found to be much diminished, perhaps it is absorbed more quickly, certainly it passes off by evaporation from the skin and the surface of the lungs, and by the kidneys

nearly as pure as when it was thrown into the body, and leaves the patient almost in the same circumstances as if he had not drunk it, in respect to his feeling. If a little farinaceous matter after it is coagulated be dissolved in water, and given for drink, the same sudden evacuation of the water actually does not take place. The farinaceous matter seems, while undergoing the first process of chylification, to arrest the water in the stomach, and apparently too in the blood vessels, so as to prevent its being thrown out by the secretory glands; as it is certain that when such a solution is drunk, the secretions from the skin, or by the kidneys, are neither so copious nor so watery, and thirst is better allayed than when water alone is drunk. The solution generally used is of barley, which may be rendered more palatable by the addition of a small quantity of the juice of some acid fruit. The seeds of any other of the gramina may be employed with equal advantage.

If a patient of a moderate degree of strength, between the ages of ten or twelve and forty-five or fifty, should be seized with
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an intermittent, and the intermission should not be perfect, he should be kept the first three or four days on this kind of food only.

Where intermissions or remissions at the beginning are more perfect, farinaceous matter coagulated and boiled until nearly, but not entirely dissolved, may be used. And where remissions continue very imperfect beyond the third or fourth day, food of this kind becomes necessary. It appears from Galen, that the Greek physicians were extremely careful with regard to the degree farinaceous feeds ought to be boiled. But much depends on the state of the stomach of the patient; strong digestive powers would throw out soon from the stomach through the pylorus a solution, which a less vigorous stomach could not bear, or could hardly digest.

Sago, a preparation of farinaceous matter, contained in the pith of a palm tree, may be considered as next in point of facility of digestion, and may be given where a greater degree of nourishment is wished than is found in barley-water.

Panada, bread boiled down in water, is also a nourishing food of very easy digestion.

Any of the farinaceous feeds of the gramina, barley, for instance, may be boiled first in a little water, that thrown away and fresh water being added, it may be boiled until it is almost entirely dissolved; or it may be boiled until it is softened, and mixed with raisins, or other such dried fruits towards the end of the boiling. Such fruits as are not apt to become flatulent or acedent, such as grapes, figs, peaches, apricots, oranges, or baked fruits, as apples, &c. may be used at the beginning, when there are crises, but imperfect ones. No food of more difficult digestion should be employed until the crises, and consequently the intermissions, shall have become tolerably perfect. When they are but perfect in a certain degree, that is, when there is still languor, some head-ach, &c. after the crisis, milk and animal broths may be added to these. When the crises are quite perfect, solid animal food may and ought to be employed on the intermediate day, at the time of the principal meal. On the

the day on which the paroxysm takes place, foods of easier digestion as above enumerated; but nothing solid should be thrown into the stomach for six hours before the paroxysm, nor till the crisis is completed.

Lamb and veal have this advantage over other meats from quadrupeds, that the flavour depending on the essential oil of the animal is not so strong, and provided they are fat they may be employed advantageously.

Many practitioners have objected to the use of expressed oil as food in all cases; but it appears to have arisen merely from the superstition of denying what is grateful to the palate. Expressed oil, when used alone, produces a sense of weight in the stomach, a degree of sickness, and that particular sensation called cloying, none of which occur when it is mixed with farinaceous or mucilaginous matter. It takes off the adhesiveness of these, as also of the solids of young animals, and fat is less prejudicial in them than in older animals, when it has acquired a strong flavour.

The elder animals of the same species are better in broths, taking care to let them cool, so that the expressed oils, which contain the essential or flavoured oils, may be carefully taken off and rejected. Their broths are less adhesive and glary than those from young animals.

Rabbits are also proper; but their muscular fibres not being interspersed with expressed oil are adhesive when young, therefore such as are of a year old at least ought to be chosen. From these examples it may easily be judged what other kinds of animal food from quadrupeds are proper.

Such fishes are eligible whose flavour is not considerable, generally such as are of a white colour; such as are not adhesive but of a certain degree of firmness; whittings for example, haddocks, flounders, turbot. Those which give a gelatinous solution, as plaice, should be rejected; and others, as soles, which from their firmness are of difficult digestion, and most of all, highly flavoured fishes.

Shell-

Shell-fish of all sorts are of very difficult digestion, and ought even to be rejected where the intermissions in fever are very perfect.

Milk, where it is not coagulated too firmly by the strongly coagulating juice of the stomach of adults, is proper, but ought never to be coagulated before it is thrown into the stomach. All other animal food should be coagulated by heat.

Birds, as several species of the gallinæ and passeræ of Linnæus, such as common fowls, pheasant, peacock, guinea-hen, partridge, quail, common sparrow, &c. may be used.

The empyreuma acquired by roasting or baking of meat renders it difficult of digestion, it should therefore seldom be employed in this way, but it should be perfectly coagulated by boiling, &c. which is more particularly necessary in the older and high flavoured animals.

Frying is an extremely improper mode of coagulating food, the original flavour being

entirely retained, and a considerable degree of empyreuma acquired. This mode ought never to be employed.

Broiling, if the food is not high flavoured, is often very proper, when the food to be broiled is thin.

A variety of different substances for food have been enumerated, and even those only as examples, that the practitioner may not only be able to adapt the food to the powers of the stomach, but that he may be likewise able to allow a greater variety of food when the patient requires much nourishment; i. e. when the intermissions are become perfect, and the disease going on through its natural course. Attention to the food is of much consequence, where the practitioner wishes to prevent the disease going through its natural course.

It often happens, almost always, that the usual time of one principal meal will take place once during the intermission of a regular tertian, so that there shall be at least twelve hours before the next return of the disease.

disease. When it arrives the patient should eat a moderate meal of such food as has been recommended according to his appetite and powers of digestion. He ought not to restrain himself, as the body would become too weak for want of sufficient nourishment, should the fever go through its natural course. On the contrary, he should not be enticed to eat too large a quantity by entreaty, rich sauces, spices, or high flavoured food.

It seldom happens that the hour of the principal meal recurs twice after the fever is entirely gone off, and so that the second shall be ten hours before the commencement of the next paroxysm; but where it does, it is better to refrain from eating so much at each of the principal meals as the appetite might seem to require, as in this case the nourishment will be sufficient from two very moderate meals.

When the time of one of the principal meals interferes with the paroxysm; either the usual hour may be adhered to, giving only vegetables, even although the patient had
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been accustomed to much animal food when in health; or otherwise it may be altered. This depends partly on the degree of habit of regularity the patient has acquired. Where it is great, and the time does not happen within six hours of the paroxysm, it is better to employ a light repast, and of vegetables only; because where the habit of regularity is strong, if the time be passed for an hour only without eating, the appetite is lost, and great disturbance is produced in the system, and that for a very long time, so that it would tend to render the next paroxysm irregular, perhaps the whole of the disease.

Where a patient has been accustomed to make his principal meal at various times, digestion will go on perfectly, if the time be changed three or four hours, so as not to interfere with the disease; therefore in this case it is better to anticipate that principal meal, which would naturally take place, to six hours before the paroxysm.

That food of great nourishment should be allowed at the time of the principal meal is
contrary

contrary to the opinion of many practitioners of eminence, and would be improper in a disease of shorter continuance than three or four weeks. It is at present supposed that the tertian is to be suffered to go through its natural course, and in four months strength would be entirely exhausted, were a small proportion of food only to be used, and that of the least nutritive kind.

The other meals, such as breakfast and supper in this country, breakfast and dinner among the Romans, should be kept totally clear of the paroxysms, and should consist of foods easily digestible. No animal food should be allowed, but vegetable, such as farinaceous matter, fruits not much disposed to ferment by the vinous or acetous fermentations, nor prevented from fermenting by drying or exposure to heat.

To give an example in a regular tertian, the paroxysms of which take place at ten in the morning, and where the intermissions have become regular and perfect. On the day on which the patient is perfectly

fectly free from the disease; breakfast in the morning may be, where the patient is accustomed to it, tea with milk and sugar, and bread with butter, not rendered empyreumatic by heat. The dinner, soup, fish, and meat, with fruits, all of such kinds as have been enumerated; but this variety only where the patient has been accustomed to it. The supper may consist of potatoes or rice, and milk, sago, or other things of the same kind, with a moderate quantity of wine.

If the patient should sleep during the night before the paroxysm, nothing but a basin of barley-water should be given at six or eight in the morning. If instead of ten the paroxysm should come on at twelve, or later, tea with bread and butter, or such other food may be given at eight in the morning. If the paroxysm should take place at ten, it will probably go off by eight in the evening; and the patient when he feels easy should eat sago, barley boiled down with a moderate quantity of wine, and bread with milk, &c.

When

When intermissions again become irregular, towards the end of the disease no solid animal food whatever should be employed, but only such as are proper at the beginning of the disease, in more liberal quantity.

To conclude, for the first fortnight food of easy digestion should be used; afterwards more nourishing food, according to the perfection of the intermissions; again food of easier digestion when they grow imperfect towards the end.

If the first attack of a tertian comes on when there is undigested food in the stomach, the stomach is so much disordered as not to be able to complete the digestion. A quantity of undigested matter therefore remains in it, sometimes for several days, becomes acid, or enters into the putrefactive fermentation, and acts as a ferment upon whatever is thrown in of even the lightest food; it counteracts the digestive powers of the stomach, and continues to propagate the same kind of matter as long as it remains there, producing a disagreeable sensation in the stomach, and preventing the intermissions from being so perfect as they otherwise

otherwise would be. It is natural to suppose that the vomiting which takes place at the commencement of the disease would clear the stomach; but that it is not so is evident, for where the natural vomiting has been violent and long continued, upon administering an emetic a large quantity of undigested matter has been thrown out. An emetic should therefore be always exhibited when the time between the last meal and the paroxysm has been too short for perfect digestion; or there should be other reason to suppose that food remains in the stomach.

If during the progress of the disease appearances should again arise, which indicate that the stomach does not clear itself of the whole food, or that there are regurgitations of matter from the duodenum through the pylorus into the stomach, the emetic should be repeated. This is indicated by want of appetite on the day on which the paroxysm does not take place when there are no other symptoms of disease. It would not however be adviseable to exhibit an emetic, if this happened once only; but if it should

should continue during several periods of the fever, while the patient lived properly with regard to air and exercise, it would be necessary to repeat the emetic. Noxious matter contained in the stomach produces, besides want of appetite, acid, bitter, or putrid eructations, pain in the forehead, and fur on the back part of the tongue. It is generally supposed that the quantity of noxious matter is considerable, or that it consists of solid substances, but a fluid may disagree as readily as a solid, produce disagreeable sensations, and prevent the stomach from acting on the food, so that the digestive fermentation shall not go on properly. If the very small portion, which may act as a ferment, be considered, it will appear how small a quantity may affect the digestion, and in consequence the patient may be relieved by the emetic, although no great quantity of matter be thrown off from the stomach.

If the emetic be exhibited before the food has had time to pass down from the duodenum, it may cause it to be regurgitated, and so thrown off; or if the last meal has
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passed down from the duodenum, the emetic may occasion a quantity of bile, pancreatic juice, and the other fluids, secreted by the glands of the duodenum, to be secreted and regurgitated into the stomach, in which case the patient appears to throw a great quantity of these substances from his stomach. These would not have been there, but for the exhibition of the emetic: this is proved in the sickness produced by the motion of a carriage, to those unaccustomed to it, and in sea-sickness, where a great quantity of bile, pancreatic juice, and the other fluids, secreted by the glands of the duodenum, are thrown up, when the stomach was perfectly empty before the agitation. Therefore as it does not follow, when a small quantity is thrown up in consequence of an emetic, that no noxious matter was contained in the stomach; so neither when bile, pancreatic juice, &c. are thrown up, does it follow that they were contained in the stomach, or in any cavity, previous to the exhibition of the emetic, but that a secretion might be occasioned by the emetic, which would not otherwise have taken place.

When

When the emetic is not exhibited till eight hours after the principal meal, if part of the food is thrown up undigested, it certainly shews a deficiency in the digestion. Whether it remains at this time in the stomach, or duodenum, it is equally noxious, and should be a cause of preferring lighter food.

It happens also frequently, that a kind of slime forms in the stomach in intermittents, which seems too tough to be carried through the pylorus, and not capable of the digestive process in the stomach; this produces the same, or even worse appearances than undigested food, even if in small quantity, and is another cause of the necessity of exhibiting emetics.

It is by no means equal, what means are employed to produce vomiting; but that will be treated of afterwards.

When an emetic is employed for the above purposes, it is necessary the patient should drink some warm watery fluid, to take off the stimulus of a vain attempt to

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evacuation. This vain attempt happens, when any moving part exerts itself to throw a substance out of a cavity which cannot be evacuated by the effort, or when an effort is made when nothing is contained in it; and pain and other effects of stimuli are produced. The patient should drink half a pint of warm water, and when the fit of vomiting is over, another half pint; but if no third paroxysm of vomiting should take place, warm water is not to be given to excite it. But if in the second fit of vomiting a quantity of solid or undigested food should be thrown up, a third fit should be excited in the same manner as the second, which constantly clears the stomach of all noxious matter, remaining from indigestion; therefore it is no longer necessary to drink more than a sufficient quantity of some fluid, to wash the throat and mouth.

To recapitulate what we have said with respect to the proper food, and rendering the stomach fit for its digestion, the only food proper, where the disease puts on the appearance of continued fever at the beginning, excepting

excepting that exacerbations do not take place in the evening, are solutions of farinaceous matter: where there are crises at the beginning, although very imperfect, farinaceous matter in substance coagulated and boiled down again until soft, should form the nourishment; if the crisis at first should be nearly perfect, the food during the first, or even second week, should be farinaceous matter, and fruits; but in the second or third week, if the crisis should become perfect, or nearly so, milk not coagulated, and animal broth may be at first added, and sometimes solid animal food of easy digestion. When the crisis becomes perfect on the day on which the paroxysm does not take place, according to the state of the patient, food should be exhibited nearly in the same manner as in health. No solid food of any kind, and of fluids only solutions of farinaceous matter, should be allowed for eight hours before the coming on of the paroxysm. After the paroxysm is over, farinaceous matter in a solid form, broths or milk may be made use of on the day of the paroxysm; and finally the stomach

mach should be kept free from noxious matter by emetics.

The state of the intestinal canal requires particular attention. In a regular tertian, where no accident takes place, the peristaltic motion goes on with tolerable regularity, excepting during the paroxysm; sometimes however, the want of peristaltic motion, or the diminution of it, which takes place during the paroxysm, does not go off immediately after the crisis, when the crisis is incomplete; in this case, so far as it affects the intestinal canal, laxatives must be employed to prevent the retention of fæculent matter in the intestines; for if any remains when the next paroxysm comes on, the whole system is greatly deranged by it, and an imperfect crisis is often produced.

Some practitioners have supposed that this disease depended on a humour, which might be evacuated by purgatives. They have not however shown from experiment, that any humour, that is to say, any fluid or solid, possessing noxious qualities, subsisted

sisted in the system. This opinion might be overlooked as mere hypothesis, were it not to warn young practitioners against the employment of purgatives in regular tertians, excepting to produce regular evacuations, as they tend to produce irregularity and accidents in the disease. The author has seen instances of the reproduction of the disease, after it had been carried off naturally, or by remedies, by the use of a purgative, and there are many such recorded.

This subject will be more fully treated of afterwards. All to be done then is to take care that no fæculent matter is retained in the intestinal canal. This should be prevented by employing the most gentle laxatives.

Purgatives are of several descriptions; there are some that stimulate the orifices of the excretory ducts of the glands of the intestines, and by that means produce a copious flow of watery fluids, that is principally of superfluous water, with the salts, and putrescent mucilage of the blood. These fluids, by their quantity, and possibly by

the stimulus of the salts contained, increase the peristaltic motion of the intestines, and produce copious watery evacuations. Neutral salts are purgatives of this kind, for instance natron vitriolatum, natron phosphoratum: as are likewise salts consisting of acids and magnesia, as magnesia vitriolata; likewise solid acids that require a great quantity of water to render them fluid, as tartar, &c. these affect the intestines only, and hardly produce any alteration in the general system; they are however, not proper for the present purpose. Copious evacuation is not wanted, but simply that any noxious matter should be evacuated.

There are several purgative juices contained principally in fruits, or the flower leaves of flowers. It has not yet been ascertained whether they contain one substance or several; this substance is contained in tamarinds, prunes, cassia; the like kind of purgatives is also contained in the flowers of the damask rose, of violets, in manna, &c. These have a kind of mixed operation, they partly stimulate the ends of the excretory ducts
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of the glands, opening into the intestines, and partly tend to increase the peristaltic motion of the intestines, but rarely have any effect on the system generally. These are apt to produce flatulency. These would be more proper than the class enumerated, but they are too uncertain in their operation to be depended upon. There are purgatives which increase the peristaltic motion of the intestines alone, and occasion the contents of the intestines to be sooner carried downwards and evacuated, having at the same time little or no tendency to increase the secretion, excepting accidentally, as rhubarb, sulphur, &c. If not given in too large doses these have no effect on the system generally; if given in too large doses they occasion spasmodic contraction of the intestines, and consequently griping pain, and by that means affect the system generally. If however, twenty-five grains only of rhubarb, or a drachm of sulphur, should be employed in adults, they will commonly have sufficient effect, and neither violent griping nor affection of the system will be produced. Purgatives such as jalap, scammony, colo-

quintida, and the like, at the same time that they act on the intestines, make an impression on the whole system, are therefore certainly improper.

That these effects are actually produced by these different kinds of purgatives, is proved by employing them on a man in perfect health. Give a man in perfect health an ounce of natron vitriolatum, or any other of the first kinds of purgatives in a proper dose, dissolved in four ounces of warm water, to prevent them from affecting the stomach too much; in two or three hours a copious watery evacuation shall take place, and be followed by three or four others, and the whole effect of the medicine be gone off in four or five hours, with hardly any griping, or any alteration of the pulse, or any other operation on the system. Give a man also in perfect health an ounce or two of pulp of cassia, or any of the purgatives of the second class, in five or six hours after, griping, flatulency, and disorder in the bowels, a half watery, half fæculent flatulent evacuation, shall take place,

place, followed by borborygmi, and one or two evacuations of the same description. Give to another man in health twenty-five grains of rhubarb, in two or three hours afterwards he shall feel a disagreeable sensation in his bowels, followed by some griping, and soon afterwards a copious fœculent evacuation shall take place, perhaps a second one of the same kind, the person not feeling any other affection of the system, nor any frequency of the pulse. Give to another person in health fifteen grains of jalap, in an hour or two he will feel uneasiness in his stomach, a disagreeable sensation all over his body, the pulse will be quickened, and with perhaps less griping than when the cassia or rhubarb were exhibited, there shall three or four copious watery evacuations follow afterwards, with moisture on the skin, or sometimes copious sweating.

Indeed it is possible by mixing the different species of this fourth kind together, and exhibiting small doses, to produce the effect without making any great impression on the system; but it is unnecessary to have recourse
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to them when there are a sufficient number of the proper kind. Generally great advantages are derived by mixing different species of purgatives together; but this disquisition would lead to too great a digression in this place; we may only notice that for the purpose of keeping the primæ viæ clear of fæculent matter in regular tertians, it is better to mix rhubarb, sulphur, &c. together, than to exhibit them singly.

When laxatives are employed, their operation should be entirely over, and the intestines perfectly quiet, before the commencement of the next paroxysm. When those which increase the peristaltic motion only are exhibited, it is long before their effect has entirely ceased; therefore when it is necessary to employ them, they should be exhibited at least eighteen hours before the succeeding paroxysm is to take place.

Excepting at the beginning of the disease no purgative should be exhibited without there be costiveness, or disorder of the intestines.

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When a tertian begins without any crisis, but nearly similar to a continued fever, it sometimes happens that the exacerbations take place in the morning, and relaxations at night; sometimes the exacerbations take place in the evening in the same manner as in continued fever. In the first case the time of relaxation is the ordinary time of sleep, and the patient sleeps tolerably well during the night; but in the second the exacerbation being at its greatest height, at this time the patient is prevented from sleeping. It is not proper in either case to employ opium, the sleep it produces under these circumstances being restless and unrefreshing. When the paroxysms and remissions of a regular tertian become perfect, if the paroxysms should happen at ten in the morning, the first stage continuing an hour, or an hour and a half, the second two, three, or four hours longer, and a crisis should then take place with profuse sweating towards the middle or end of the crisis, the patient falls into sleep from the fatigue of the paroxysm, sleeps an hour or two, during which time the crisis terminates, and the patient generally wakes languid:

languid: if the intermission is perfect he sleeps sound during that night, commonly sweating during the course of it, and the next night he sleeps nearly as in health. If the paroxysm should take place at four in the evening, the first stage continues till six, the hot fit continuing till ten; should the crisis come on at this time with profuse sweating, the patient commonly falls asleep about twelve or one, and sleeps without intermission the whole night, waking with some degree of fatigue, which however goes off. The sleep is natural, or nearly so on the succeeding night. Should sleep either not take place, or be very restless, the practitioner is to attend to any accidental cause; as improper food, fæculent matter contained in the intestines. These apparent causes ought to be removed before opium is employed, otherwise the sleep produced by it will still be restless and unrefreshing.

If want of sleep or unrefreshing sleep should take place without any such apparent cause, opium may generally be employed advantageously

advantageously during the whole time the intermissions are regular and perfect. About two thirds of a grain is usually a proper dose. The operation is rendered more effectual by the addition of a small quantity of ipecacuanha, or some active preparation of antimony.

When a regular tertian continues two or three months, and the paroxysms become flighter, but longer, and run into one another, opium may be employed with great advantage, should the sleep be restless and unrefreshing.

This is sufficient at present with regard to procuring rest by opium, or its other effects. The Author will have occasion to attend to it farther afterwards.

When the paroxysm is about to come on, the patient should be laid in bed, where no part of the system is disturbed by his situation. The heart neither has such a height to throw the blood as in an erect position, nor have the powers of circulation such a
column

column of blood to sustain and overcome in the ascending veins. The heart therefore and the powers of circulation are left to employ their whole force unincumbered, during the paroxysm of the disease. When in a horizontal posture, the body is supported on a great number of parts, consequently the pressure is more equally on every part of the body; the system is not exhausted by an exertion of muscular power to keep the parts supported in balance. A more equal degree of warmth, moisture, and relaxation takes place in bed over the whole body, and gives a greater disposition to the crisis taking place early and being more perfect. There are no ligatures applied to any part so as to prevent the blood from flowing freely. The patient should go to bed about an hour before the commencement of the paroxysm, continuing there during the whole of it. This is not so necessary however towards the end of a regular tertian, when the paroxysms become slighter and are extended to a greater length.

It

It is by no means proper that the patient should be in bed during the intermissions, excepting at the ordinary time of sleep.

The muscles lose their firmness by continuance in bed during health for a longer time than necessary for sleep. The whole body becomes plumper, softer, more disposed to be acted upon by every thing that has effects upon it, such as emetics, purgatives, exposure to cold, stimulants, and the causes of disease. The strength of the moving parts is very considerably diminished by lying in bed: the powers of digestion are diminished, the appetite is not excited from the same want of food. Less food is received into the stomach, and the same food is more apt to produce disturbance in the system. By continuance in bed a man also becomes languid in his mind, and more unwilling to exert himself in exercise, or labour of any sort.

During the intervals of the paroxysms, excepting that the patient should be allowed to sleep, if he be disposed just after the
paroxysm

paroxysm is gone off, and during the natural time of sleep, the patient should dress in his ordinary cloathing, and that even in cases where he is too weak to remain in an upright posture, which however does not happen in the case the author is now treating.

The exertions which take place during the paroxysm, leave the patient somewhat weaker after the crisis has taken place and the whole paroxysm completely gone through, than he would have been independent of it. The natural powers of the body soon get the better of this weakness, and restore the patient to his former vigour. When a new paroxysm succeeds a former one, after a short interval, this will also exhaust the powers of the body in a similar manner, and leave the patient still weaker. Were the disease however to consist of two regular paroxysms only, both terminated by complete crises, the natural powers of the body would probably overcome this second weakness. But when paroxysm returns after paroxysm, as is the case in even the most regular tertian, and repeated weaknesses are left after each,
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he does not recover sufficiently in the intervals to encounter the next, with his powers perfect, and of course every subsequent paroxysm will leave him still weaker, supposing that the disease were perfectly regular from the very beginning, and during the whole of its progress.

When there is hardly any remission at the beginning of a tertian, and afterwards imperfect intermissions, there is not time during the interval, for the strength to be recruited, in the same manner as when the intermissions are perfect, or nearly so. In this case, by the time the intermissions become regular and tolerably perfect, the patient is already much reduced in strength, and if care be not taken to keep up the powers of the body after the intermissions have become regular and perfect, the patient may not be able to support the shocks of the subsequent part of the disease. He may either sink in the cold fit, or when towards the end the paroxysms grow more irregular, weakness may take place in such a degree as to prove fatal, or the disease

may be rendered irregular. When the paroxysms become regular, the practitioner should therefore endeavour to restore the strength of the patient as much as possible to its natural state.

The first attention to this indication, is to employ proper food, to take care that the primæ viæ perform their functions well, that sleep be encouraged, and that the patient shall not indulge himself in bed when it is not the time of natural rest, and when the paroxysms are completely over.

Practitioners have imagined that something more might be done to recruit the strength of the body, when merely leaving it to these natural means: that medicines might produce this effect; but their ideas on the subject are very much confused, which renders it necessary to investigate the subject more particularly.

The idea of strength which first presents itself in inanimate matter is cohesive power. Steel requires a greater force to break it than marble, therefore is deemed stronger.
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Although the same power will bend an equal bar of gold which will not bend an equal bar of steel, yet if equal bars of these metals be fixed at one end similarly in every respect, a weight at least four times as great will be required to break the gold as will be necessary to break the steel, if hung at the other end of the bar. In this respect the gold bar is the strongest; but if the idea of strength be taken from their bending, the steel. Both these ideas of strength have been adopted by practitioners in medicine. The strength consisting in inflexibility, may be admitted in parts of the human body, such as bones, although not rigorously. A bone is said to be strong which does not break when a great power is applied to it; weak, when broken by a slight one.

That strength which prevents parts from being torn asunder, has often been considered as strength in medicine, as when the gastrocnemii muscles contract suddenly, or with great force, the tendo Achillis sometimes gives way; it wants therefore sufficient cohesive power to apply the force of

these muscles to the foot. In this case the muscular power of these muscles cannot be said to be diminished, because their force of contraction is sufficient to overcome the strength of the tendon; it is the tendon only that is weak. In similar cases therefore it cannot be said that the body generally is weak.

When the whole of a contractile fibre of a muscle contracts at once, all the particles must come nearer each other in the direction in which the fibre contracts; it is impossible that particles can come nearer one another, and go to a greater distance at the same time and in the same direction, therefore every muscular fibre in contracting, must possess a power of resisting its whole force in every part, so as not to break by its own power of contraction. Supposing one half of a fibre of a muscle should contract, the other half should remain at rest, that which remains at rest must be looked upon in the same light as a tendon, and if broken through would not evince any want of muscular power, excepting, perhaps, so far

far as that the exertion not being in the whole muscle, the effect would be less.

The many cavities in the body of various forms destined to contain fluids or solids, may be divided into two classes, those opening externally, and those not opening externally; the gall bladder for instance is of the first kind; of the second, the cavity of the ventricle of the heart. There is also a third kind of bag, which is not naturally destined to contain any thing, but merely so much fluid as to moisten the surface so as to allow of motion, such as the cavity of the pleura and peritonæum. The first kind, destined to receive and contain, for a certain length of time, matters thrown into them, may sometimes be filled with such a quantity as to distend them to a degree that would burst them, had the body and the bags themselves lost their life. In this case the cohesive power might be considered as too weak. This hardly ever happens in the living human body. The same may be said of those cavities of the second kind, which do not open externally. Of the cavities which naturally contain only a sufficient

ficient quantity of fluids to moisten them, there are many instances of fluids thrown in so as to burst them. The skin of the leg for instance bursts, in œdematous swelling; but this has hardly ever been attributed to weakness. It has been supposed that medicines capable of increasing the cohesive power of the fibres, or membranes of the body, were capable of giving greater contractile power. Alum, oak bark, and other astringents, increase the adhesive power of the skin of a dead animal considerably, therefore have been supposed by many to act in this way as strengthening remedies, not considering that if power of contraction depend upon cohesive power, it would be absurd to apply the small doses of those medicines usually exhibited. What tanner would attempt to tan a hundred weight of leather with a drachm of oak bark?

Muscular strength does not therefore depend on cohesive power.

Elasticity is the property by which the particles of an inanimate solid come nearer to, or recede from one another.

If a steel rod be bent, the particles on the inside of the curvature will be brought nearer to one another, while the particles on the outside of the curvature will be carried to a greater distance, but without loss of continuity, for as soon as the bending power is removed, the particles that were brought nearer will force themselves to a greater distance, and those which were on the outside of the curvature will approach each other, and not only so as to restore the bar to its original state, but likewise to give it a bend on the opposite side, and so it will continue to vibrate for some time.

If a rod of any elastic substance, such as steel or catgut, be fixed perpendicularly at the upper end, and a weight be hung at the lower end, the rod will be drawn out to a greater length, but at the same time become smaller in diameter. Upon removing the weight it will return to its original length and diameter, and vibrations will take place in it, which may be considered as similar to those which arise, on removing the bending power from the bent rod.

If a force be applied to both the ends of a cylindrical rod of steel, so as to press them towards one another, the rod will be shortened and rendered of a larger diameter; on removing the power the rod will return to its former length and diameter; similar vibrations taking place until it settles at its proper length.

If a steel ring be pressed forward upon a cone, the diameters of which increase slowly, the diameter of the ring will become greater, but on withdrawing the cone, vibrations will take place in the ring, until it settles at its original diameter and thickness.

If a rod of a perfectly unelastic substance be fixed at one end, and the other be drawn in the direction of its length, it will break without having been lengthened in the least.

An elastic rod thus drawn out will allow itself to be lengthened to a certain degree, but will afterwards be broken.

If a dead muscular fibre be fixed at one end, and a weight be suspended at the other, it will be drawn out to a greater length; the weight being removed it will return to its original length.

In the same manner, if a dead muscular fibre be pressed together by a power applied at the ends, it will be rendered shorter and thicker; on removing the power it will return to its former length and size.

If a dead muscular fibre be bent into a ring, and any power be applied to distend it, its diameter will be increased, but when the power is removed, it will return to its former state.

So if a power be applied to lessen the diameter of a dead muscular ring, it will contract, but on removing the power, it will immediately increase to its former size, and vibrations would take place were nothing to act but elasticity.

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The moving fibres of the body are therefore endowed with an elastic power, by which, on being either extended or contracted beyond their natural state, they will be restored as soon as the power is removed, by which they are distended or contracted.

Whether the muscular fibres in the living body are prolonged beyond what their elasticity would allow, or shortened more, is a question only to be decided by experiment.

If an animal be suddenly killed by a cause not affecting the elasticity, it will be found on laying bare any muscle, and dissecting it out, that the muscular fibre will extend on replacing it, far beyond the length from its origin to its insertion; its elastic power, a power independent of life, remaining the same, the power of life only being destroyed. From this it will appear, that it had been contracted by some other power, while the animal was alive, more than it would have contracted by its elasticity; therefore that
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there is a power constantly contracting the muscular fibres of a living animal to a shorter length than they would be contracted by their elasticity.

After the life is entirely gone out of an animal which had been killed in the same sudden manner, the blood vessels, which are perfectly cylindrical, and perfectly full, are immediately enlarged, so as to be capable of holding a much larger quantity of blood. There is not blood enough nearly to fill the ventricles of the heart; there is so little blood in the arteries, in proportion to their cavities, that the ancients supposed they contained air only. The capillaries are not nearly full of blood, which appears from the paleness of the different parts of the body; they become florid, if an injection be thrown into them of no deeper hue than the blood. The veins, instead of being cylindrical, are flat, and not half full of blood. It cannot be denied that the elasticity remains the same in such a death. It is therefore constantly tending to enlarge the vessels, and prolong every moving fibre, but is overcome by a superior power, which exists

exists in consequence of the life of the part.

It has been shewn therefore, that the fibres of the body, and the parts capable of producing any action, are not governed by the adhesive power of their particles, nor by their elasticity, as they are always contracted in one direction, more than they would be by their elasticity. This other contractile power has generally been called muscular action.

Muscular action seems to be exerted when the animal is at perfect rest. A contraction takes place continually in the moving part, which is greater than the elasticity of the part, and is constantly counteracted by it. When the tone of a part is spoken of, this is to be understood.

There is an instance of this constant action counteracted by the elasticity of the part itself in bivalve shell-fish: there is in a cockle an elastic ligament on the outside of the shell, which endeavours to open it, and muscles which counteract the elasticity of
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this ligament, which, when they exert their force, overcome the elastic power of the ligament, and shut the shells: when these are not forced into action by the animal's dread of an enemy, the elastic ligament opens the shell to a certain degree, but not nearly so much as if the muscles were cut through, and the ligament left entirely to its own elasticity. The muscles therefore, when the animal is at rest, are still contracted, so as in a certain degree to overcome the elasticity of the ligament; and this contraction is the tone of the muscles.

It is the same where the elasticity of the muscular fibres themselves counteract the tone. The urinary bladder, for instance, which in a body, recently and suddenly killed by any means which destroy the life in all the parts, such as a blow on the stomach, would allow a quart of urine to be contained in it without overcoming its cohesive power, or bursting it, or without resistance by its elasticity; while the animal is alive, sometimes, will not allow itself to be distended, so as to contain a pint without
being

being stimulated to evacuation, sometimes not half a pint. It will at the same time allow itself to be distended to a less degree, without any stimulus at all. This resistance in the urinary bladder to be distended above a certain degree in a living animal cannot be from the cohesion of its particles, for it may be distended twice, thrice, as much, or more, without bursting: nor can it be from its elasticity, for the elasticity remains the same after its death, and yet it will then allow itself to be distended to a greater degree without any resistance; nor can it be from its muscular exertion, for when the muscles contract, they evacuate its contents. It might be suggested indeed that it was not the muscular fibres of the bladder itself that evacuate its contents, but the pressure of the muscles of the abdomen upon the bladder; but every man from his feelings will perceive, that although the pressure of the muscular fibres of the abdomen do indeed assist in evacuating the bladder when much distended, yet very often the evacuation is evidently made without any exertion of the abdominal muscles.

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This is further proved by cases where the muscular fibres of the bladder become paralytic, in which case the urine is not evacuated, although the muscles of the abdomen have their full power.

It is evident therefore, that the extent to which the urinary bladder will allow itself to be distended does not depend on the cohesive powers of its fibres, nor upon their elasticity, nor upon the muscular exertions when stimulated to contract, but on a disposition in the muscular fibres to allow themselves to be distended to a certain degree, and no farther, without being stimulated to contraction. This disposition is their tone.

In the stomach likewise a contraction takes place, which will allow it only to be distended to a certain degree. When empty it will readily admit a certain quantity of food, but if a greater quantity be attempted to be thrown in, it will resist the reception of the surplus; pain, uneasiness, and nausea will be produced, although the stomach is not distended nearly so much as its cohesive power or elasticity would allow.

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The other power exerted is a still farther contraction of the moving fibres, which shortens them much beyond their tone, and is called the action of a part, as when the stomach contracts upon the food in digestion, and forces it through the pylorus, or when any muscle moving an extremity contracts, so as to produce that motion. This contraction does not remain constantly the same for any length of time, for first it is evidently alternate, as in the action of the auricle of the heart, which no sooner contracts but it relaxes again, and so of the muscles of respiration, the peristaltic motion of the intestines where the alternation is very evident. In the muscles extending, or otherwise moving an extremity, the alternate action is not so apparent; but there it may be rendered visible by magnifying it, by placing for example a long flexible rod in the hand of a strong man; if he extends his arm, the motion of the end of the rod will evidently shew that the muscles of the arm are making alternate contractions and relaxations.

There are therefore two muscular powers,
 one keeps the muscular fibres when at rest,
 contracted

contracted to a certain degree beyond their elasticity, the other produces a still greater contraction, which is only temporary.

The tone of a part is not always the same. The stomach of the same person, for instance, will at times allow itself to be greatly distended without making resistance, at others it will resist, if a small quantity of food or drink be thrown into it.

It does not follow because a part is strong, that the tone is such as to allow of only a small distention. There is a certain degree of tone which is the natural and proper one for a moving fibre. When the stomach is weak it will frequently only admit a small quantity of food, without being stimulated by the distention; when strong it will admit frequently a great quantity of food without making much resistance.

Where a moving part consists of many moving fibres, and in one of these fibres

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there

there is a proper tone, another fibre is contracted beyond its ordinary tone, another at the same time too is distended by its elasticity beyond it, that part can never be said to be strong, because if brought into action that fibre only will produce the proper effect, which is of the ordinary length according to its natural tone.

The frequent attacks of a regular tertian are apt to weaken the tone in both ways.

After a tertian has continued some weeks, the stomach and intestines instead of possessing an uniform tone are contracted in some places, in others relaxed to a greater degree, so that spasmodic contraction takes place in some parts, flatulency in others. The muscles in the extremities become flabby. The action of all the parts therefore becomes less powerful and regular than in health. To remedy this, a class of medicines have been employed during the progress of the disease, with a view to restore and keep up the tone. These medicines, as contained in the *Materia*

Medica

Medica of the London College are, abrotanum, absinthium maritimum, absinthium vulgare, carduus benedictus, centaureum minus, chamæmelum, cinchona, columba, cortex aurantii, cortex limonum, gentiana, quassia, fantonicum, tanacetum; all these contain a bitter juice. Whether that bitter juice be the same in all, as the sugar and astringent matter of all vegetables are the same, has not been determined by chemical experiment. They contain various other matters which have medicinal powers; the absinthium contains an essential oil totally different from its bitter juice: cortex aurantii not only an essential oil, but also an astringent juice, perfectly distinct from the bitter one. This kind of bitter juice itself seems to have the same effect in preserving or restoring the tone, from whatever plant it is taken, and various preparations of iron have also a similar property. But how these substances should contract fibres too much relaxed in their tone, or relax fibres too much contracted in it, is not at all known.

There are some remedies the mode of action of which can be easily ascertained.

When a quantity of superfluous acid is formed in the stomach, every chemist must know that chalk or alkali thrown down will unite with the acid, and destroy its acidity. Any man acquainted with the natural history of the insect or reptile which produces the itch, would be able a priori to apply a remedy. He would know, that it was apt to creep from the body it already occupies to the body of another man which came into contact with it. That it would bite and stimulate a part where the mucus was soft, as between the fingers for instance, and occasion scratching, and excite a sufficient degree of inflammation to produce a pimple. That it would lay its eggs and propagate in this pimple, from which the animal itself has frequently been taken out and shewn in a microscope. So far skilled in this distemper, he would naturally apply a poison, perhaps sulphur with grease, if he had no idea of cleanliness; but if he had a greater regard to cleanliness, he might wash the parts affected with a solution of corrosive sublimate in water, and he would continue the application until the animal itself was

was killed, and all its eggs hatched, and all its young destroyed, which happens in about a month, and so cure the disease. In these instances the mode of action of the medicine is known.

Here the mode of action is sufficiently evident, but when a medicine is to act upon the living powers of the body, it is impossible to account for its actions from mechanical or chemical principles, because the living powers are not governed by mechanical or chemical laws, and all the knowledge respecting them must be learnt by experiment only. So the chemical effects of a chemical operation are known; but how these effects are produced is not known. We know that sulphur and pure air form vitriolic acid, but why, no man can tell.

A bitter medicine does not act in restoring tone by increasing the adhesive power of the moving parts, for the tone does not depend upon the adhesive power; neither

does it act upon the elasticity, for by this the tone is counteracted.

Where its tone is diminished, so that a moving part is contracted too much or too little, in consequence of a disease; after the entire cessation of the disease, as after a hæmorrhage arising from an accidental cut into a blood vessel, the tone will be much sooner restored if bitter remedies are exhibited than it would be naturally. That is, if spasmodic contractions should take place, they will sooner go off; if the muscles become flabby they will sooner become firm; if water be deposited, so as to form œdematous swellings, the tone will be restored to the exhalants and absorbents, and water will be no longer deposited. These instances are sufficient for demonstrating that these medicines have a power of restoring the tone.

The action of many medicines producing effect upon the living powers is entirely upon the stomach. This proposition will
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be considered more fully afterwards. These bitter medicines and preparations of iron for instance do not appear to be carried into the blood vessels and applied in different parts of the body, but to act in the stomach alone.

These medicines appear to be more efficacious when mixed together than when exhibited singly; and this opinion is supported by the prescriptions of almost every practitioner who has conducted the cases of many patients. Why this is the case would lead the author at present into too great a digression.

It is not necessary to give these bitter medicines in substance, an infusion or tincture of them may be employed with equal advantage, and they are less disagreeable to the patient in this form. Nor is it necessary to give them from the beginning of the disease, they would indeed be hurtful before perfect intermissions are produced. Perhaps, it is not necessary to exhibit them until appearances of want of tone begin to take place.

They should be given during the intermission, in doses equivalent to a drachm of the bark of cinchona, exhibited every six or eight hours.

Whether these remedies give a stronger power of action, as well as restore the proper tone is uncertain. In one light, a due tone must always produce a stronger action. If there be three fibres for instance in a moving part, and one of these be contracted too much, one properly, the third too little; if the tone be restored, so that all three are by their tone properly contracted when brought into action, the whole force of the three will act together, which would not be the case while the contraction from the tone was different.

Another remedy, viz, exercise, both increases the tone and power of action.

Daily experience proves, that the power of action of a muscle is increased by bringing the muscle frequently into action. The bulk and elasticity of the muscles are also increased by it.

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Where exercise is employed to increase the power of action, in other words the strength of the human body, it must be universal. Only, that muscle or set of muscles that is brought into action have their power increased. A gold-beater exerts the powers of his arms only, while he leads a sedentary life: the strength of his arm is consequently increased, while that of the muscles of the lower extremities is even diminished; and he is so far from being generally strong, that he is subject to debility and want of tone in the whole system, excepting his arms.

There is not a sufficient quantity of living power in any animal to keep any part in constant action, excepting parts the actions of which are absolutely necessary for existence, such as the action of the heart, the motion of the muscles of respiration, &c. It is necessary that all the other exertions of the body and mind should rest for a certain length of time; that the organs of sensation should not give ideas of external objects to the mind, perhaps; that the operations

rations of the mind should be suspended, as they are perhaps in sleep; that the muscles should be brought to rest.

Exercise of any kind exhausts and renders sleep more necessary, and if it does not take place, the exercise cannot be continued without weakening or destroying the body.

Exercise diminishes the quantity of blood, which is directly proved when a man is forced to labour much without an adequate quantity of food. He not only becomes emaciated, but there is actually much less blood in his vessels, as is easily seen from the smallness of the veins during life, and the small quantity of blood he can bear to lose without occasioning death. It is also seen upon dissection after death, the muscles being universally pale, and a very small quantity of blood being found in the veins. The great appetite which takes place in a man in health after exercise is also an indirect proof, as are the large quantity he is capable of digesting, and the great evacuation by insensible perspiration.

Exercise,

Exercise, with proper food and sleep, in a pure air gives strength to the system. Exercise makes the blood return faster upon the lungs where it is exposed to pure air. It is not known by what means the blood is prevented from passing through the lungs if a sufficient quantity of pure air is not applied to it. It is certain, however, that if the due proportion of air is not inspired, a quantity of blood is brought to the lungs, which does not readily pass through them, but is accumulated in all the vessels about the right side of the heart. Anxiety and oppression about the præcordia take place; derangement and loss of strength arise in the whole system in consequence. It is therefore necessary, that a proper quantity of pure air should be applied to the lungs, to allow the blood thrown upon them to pass through them, otherwise the above appearances, followed by debility, will take place.

It is proved, that exercise occasions a larger quantity of blood to be brought to the breast, by the veins being universally rendered much fuller, a much larger quantity

tity of blood flowing out in a given time if one of them be opened. If it flows in the veins when fuller with increased velocity, more must be carried to the lungs.

In one respect the air of the atmosphere is to be considered pure in proportion as it contains the vapour necessary for the respiration of animals. This vapour, which has been called pure air, generally forms about one-fourth part of the atmosphere; but as it has been but lately discovered what proportion it generally bears, it will require some time to investigate how far a greater or less one may be beneficial or prejudicial. It has been found, that the constant and various currents in the atmosphere keep it nearly the same in the proportion of its contents. If a man be shut up in a close place where there is not his proportion of pure air, difficulty of respiration will take place, and labour or much exercise will weaken instead of strengthening him.

The atmosphere may contain vapours, or being very viscid, powders may float in it that
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may be hurtful to the lungs, or prevent the blood from passing through them so readily: gas or fixed air for example, which is always found in the atmosphere, vapour of nitrous or muriatic acid, putrid vapour, air of large towns having powdered horse dung, foot, gravel, ashes, suspended in it. Respiration will always be difficult when these substances are inspired, and therefore prevent the good effects of exercise.

The difference between labour and exercise is the attention of the mind. That exertion of the muscular power is exercise which is employed with the accord and delight of the mind, and then tends to give strength to the system. On the contrary, that which is employed against the consent of the mind, instead of giving vigour diminishes the strength. But it is extremely difficult in many cases, to discriminate what exertions of the body are with or without the accord of the mind, for mankind would naturally be always at rest, if not stimulated into action by some passion of the mind, or some real want. A North American
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rican Indian remains at rest sitting, looking strait forward, until forced into action to procure himself necessary subsistence, or until excited by passion or pain. In some measure, all exertion whatever is against the will of the mind; but that in which the passions are excited, and which is not produced by absolute necessity, is particularly the kind which gives strength. Whatever exercise therefore is employed, merely for the purpose of restoring strength, is less efficacious than where an inclination for it is excited. If a man rides out for his health, the anxiety he feels prevents the exercise from being useful; but if he is going any where, where he will be amused as in following a pack of hounds, he will be strengthened.

Exercising a diseased part tends always to derange it still more, excepting when the disease is want of tone only. Any attempt to exercise an inflamed muscle would increase the inflammation without giving strength. A muscle affected with rheumatism would be weakened instead of strengthened

strengthened by exercise while the rheumatism remained, and so generally.

In the beginning of a regular tertian, when the intermissions are imperfect, exercise ought to be avoided.

When considerable relaxations take place, the pulse returning for many hours to its natural state, the uneasiness and restlessness going off, the patient should have his ordinary cloaths put on during such relaxation. Although he is only able to lie upon the bed, somewhat more exercise will be used than if confined to it. Friction by rubbing with a flesh brush, or a cloth, is a species of exercise which does not appear to be exertion to the patient. It was much more frequently employed by the Greeks and Romans, than it is at present, probably, because the warmth of climate allowed of it without danger of the patient's catching cold. Where proper means are taken to obviate this difficulty, friction may be advantageously used in many instances, it does
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not exhaust the strength, and is extremely agreeable to the patient.

When the intermissions at the beginning of a tertian are very imperfect, hardly any other exercise than friction should be used. When they are somewhat more perfect, but not so as to admit of great exercise, the patient for the first week or fortnight, after more perfect intermissions have taken place, should only go out of his bed-chamber into another room where the air is purer. If he lives in the country, and the weather be fine, he may walk in a garden, or even among fields, for a little way; but always so, that too great attention of the mind to the state of his health be not excited.

After the disease has continued a fortnight, if the intermissions have become nearly, although not quite perfect, a greater degree of exercise may be useful, such as being carried in a chair or litter, which although disused at present, would often be advantageous, if the patient were in a situation
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to employ it; the motion of a coach may succeed as exercise of somewhat more violence, or the patient may be carried in a boat. Where the latter is used, it must only be upon a river or canal, where neither marshes nor ditches are upon its banks. If a canal, it must be of considerable length, so that the water does not stagnate; the vapour arising from stagnating water often occasioning the paroxysms to be prolonged, and the intermissions to be disturbed. It must be remembered, that a moist atmosphere is the only cause that has an effect on the disease after it has once been produced; therefore, a boat can only be used successfully in a serene and clear atmosphere.

When the intermissions have become absolutely perfect, more violent exercise is useful, such as riding on horseback.

In these exercises all the muscles of the body are exerted.

Many others frequently recommended are injurious, as they militate against the

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rules to be observed. Such are all great exertions of the muscles performed in the bed-chamber of the patient, or in any apartment where the air is confined; as striking heavy pieces of lead together, or forcing the body up and down on a chair supported by springs: in these the air is contaminated by the respiration of the patient and any other animal in the room, the patient's mind is occupied with anxiety on thinking of the necessity of thus exercising himself. The utility of exercise in a carriage of any kind will be diminished, unless the patient's mind be at the same time amused with the variety of prospects or objects presented to it, by the change from confinement, &c. therefore a chair or litter, although so easy in themselves, are often less proper than a carriage, where there is conversation, which may contribute to the amusement of the patient.

Where riding for exercise is employed, the patient sometimes becomes weaker instead

stead of stronger, unless he takes pleasure in the country he passes through, or has some object in view at the end of his journey.

All kinds of exercise for the purpose of business, considered by the patient as labour, are hurtful, but with the exception that greater anxiety may arise in the mind from suspicion that others are negligent of his concerns. Thus a ride of ten or fifteen miles, so that the patient does not over fatigue himself, will often contribute greatly to the restoration of strength, if it be to see whether something he interests himself in be properly performed, especially if it turns out according to his wish. These exercises may be continued during the time the intermissions remain perfect.

When a tertian that has been regular for a time with perfect intermissions becomes again irregular, the paroxysms flighter although longer, and the intermissions less perfect, the same tonic medicines and the same exercise may be continued.

Long experience has proved that when a disease is disposed to go off, it diminishes and goes off with as great obstinacy as it increases at the beginning.

Many practitioners have conceived that when a tertian arises in a temperate or cold country, the fever itself is the natural cure of some other evil in the constitution, therefore that a regular tertian (especially) should be left to go through its natural course. Others more sanguine, perhaps more wise, think the sufferings of a patient during the course of the most regular tertian ought to make them employ every possible means to prevent the disease from going through its natural course, and to relieve the patient immediately.

There could not be a moment's hesitation in determining to restore the patient to perfect health at once, were there any remedy or mode of treatment that would certainly prevent the returns of the paroxysms of a tertian intermittent, and take off the symptoms remaining after the crisis, so that no
other

other disease should follow. But there most undoubtedly is no medicine uniformly efficacious, or that always leaves the patient in tolerable health and secure of not being destroyed by the remains of the disease, or by any other disorder arising in consequence of it.

Were there any such, why should different practitioners attach themselves to particular varieties of bark; recommending the brown, the yellow, or the red, with such decided preference? Why should they prefer arsenic or zinc, if any one were uniformly successful? It would not be an object for men of experience, physicians who have practised in every case of the disease, to recommend one or the other variety, nor any other remedy employed for the cure of regular tertians. In many cases of perfectly regular tertians the most skilful practitioners have been baffled in the use of Peruvian bark, and every other medicine recommended as useful in the disease. Hence the necessity of laying down a mode of treatment to be pur-

sued, supposing the disease to go through its natural course, which the Author has done.

There can be no doubt but that the paroxysms of regular tertians are repetitions of the paroxysm of simple fever. The symptoms are in all respects exactly the same, excepting that in a simple fever all the appearances of the disease are carried off by the crisis. At the beginning of a tertian the symptoms are never entirely carried off by the first crisis, excepting when the patient had been before afflicted with the disease. In the middle of the disease, when perfectly regular, there is no difference whatever between them, excepting there being only one paroxysm in a simple fever; in a tertian a number of paroxysms. Towards the end of a tertian the paroxysms are less severe with more imperfect intermissions.

The only apparent reason for the return of the paroxysms in a tertian seems to be that the first crisis is imperfect. It appears probable that symptoms of the first stage
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remaining may, after a time, increase suddenly, and produce a new paroxysm, why rather at the end of forty-eight hours than at any other period cannot be accounted for.

Since also when the patient has been before afflicted with a tertian, even after the interval of a twelvemonth, a fresh attack of fever takes place, which terminates in a regular crisis, the paroxysms nevertheless return, it would seem that the habit acquired by the former tertian occasioned simple fever to take this form. Hence it may be presumed that when the intermissions become perfect, the disease is continued by habit.

Upon these grounds attempts may be made to carry off the disease, without suffering it to go through its regular course.

Although no alteration has been discovered in the solids or fluids during any part of the disease; yet it may be possible that some contraction or motion of the

body may have taken place, for the removal of which the exertions that arise in fever may be necessary.

It becomes therefore matter of experiment to determine whether a fever may be stopped in its course without prejudice to the general system.

If regard were had to the medicines only which were employed by the Greeks and Romans, and the earlier modern practitioners, it must be determined that it was seldom proper to try to stop the natural progress. But by the remedies of modern times, it is evident that tertians and other fevers may be put an end to with safety to the patient. We know however that there is not any remedy which will certainly carry off the disease, but that a regular tertian will sometimes go through its natural course in spite of every attempt to terminate it.

It is also a question to be determined, whether by stopping a tertian in its course
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some other disease may not be produced, which will either be more distressing in itself, or which may terminate in the death of the patient?

The Author is of opinion that a tertian should not be checked in its progress, if it be at the hazard of the life of the patient; but where the risk is of some other disease not fatal, it might be put a stop to in its course, for few others are more painful.

In considering the medicines to be employed when the tertian is not permitted to go through its natural course, the Author thinks it most eligible to treat of those first which appear to be pointed out by what happens in the disease itself, and afterwards of those which have been found out by accident to cure it.

Any medicine that would produce the same circumstances which happen when a perfect crisis takes place naturally, by rendering the crisis complete, may occasion the
fever

fever to be entirely carried off, and not to recur.

The first class of remedies tending to produce the same effects as occur in natural crises are emetics, which all occasion similar appearances in a greater or less degree.

Ipecacuanha, or tartarised antimony, produce these effects in the greatest degree, therefore are taken as examples.

These when first thrown into the stomach produce no sensible effect, as they are not the least nauseous to the taste; but by degrees the patient becomes chilly, begins to look pale, and an uneasiness is felt about the stomach. The sense of uneasiness is changed into a feel of sickness; the exterior parts of the body become colder and paler, the latter evidently showing that the small vessels are contracted: the skin being pale, shows the dirty brown colour of the rete mucosum and sebaceous matter of the glands of the skin. The powers of the
body

body and mind are depressed, the sickness increases, vomiting is produced, which has been imagined by some authors, not only to evacuate the contents of the stomach, but also by producing great agitation of the body, to force obstructing matters through the small vessels. But whoever has experienced the agitation produced by an emetic, and that on riding in a coach without springs on a rough pavement, must be sensible that the latter is infinitely the most violent, without producing any freedom from obstruction.

If substances are contained in the stomach those are thrown up without much uneasiness, and the stomach becomes quiet. After a time a glow of heat takes place in the extremities and exterior parts of the body, the skin recovers its colour, softness, and plumpness; sweating comes on, the sickness and uneasy sensation about the stomach cease, and the muscular powers of the body recover their force to a certain degree. The patient remains quiet for some time, soon after however the same symptoms

toms recur, and vomiting is reproduced; if any thing more be contained in the stomach it is thrown up, frequently bile along with it, and the other fluids secreted by the glands, the excretory ducts of which open into the duodenum. After the second fit of vomiting is over, the same enlargement of the small vessels and other subsequent appearances take place. The fits of vomiting, with all the concurring circumstances, may return three or four times; when they cease entirely the patient often falls into a profuse sweat, the secretions from the kidneys and intestines are increased, there is a greater flow of saliva in the mouth, and all the appearances take place which arise in the crises of fever.

An emetic therefore given during the paroxysm of a tertian, acting along with the tertian itself, may produce a more perfect crisis, sometimes such an one as to be quite complete, and the fever may not return. This actually has happened in many cases.

When the stomach is empty, and drink is not administered during the action of an
 emetic,

emetic, the vain attempt at evacuation after the contents of the stomach are evacuated, or the reaching, always prove stimulating, and deranges the system very considerably. It is often sufficient to prevent the beneficial effects of the general disposition to a perfect crisis; therefore fluids ought always to be drunk, to give something to be evacuated, independent of their washing the mouth and stomach clean.

Vomiting produced by some emetics is much more powerful than that produced by others in occasioning the appearances that take place in the crisis of fever; drinking warm watery fluids gives a disposition to vomit, which is followed by very few critical symptoms, and if the vomiting produced by other emetics be too long continued by means of warm water, the disposition to critical symptoms will be taken off, therefore the chance of producing perfect crisis.

When it is necessary to employ a vomit at the beginning of fever to clear the stomach of its contents, those ought to be preferred which have a tendency to produce
 symptoms

symptoms of the crisis of fever. Ipecacuanha more certainly produces vomiting than tartarised antimony; tartarised antimony not uncommonly passing downwards and affecting the bowels, but it is rather more efficacious in producing appearances of crisis after the vomiting is over. The better practice is therefore to mix them together.

Neither of these remedies were known to the ancients, nor indeed any preparation of antimony, for what they called stibium was undoubtedly an ore of lead; cold water, an emetic of the same kind, was employed by them, which was to be drunk, as Celsus says, *ultra satietatem*, so as to produce vomiting, and afterwards sweat. This remedy is not employed here, although it is still used in Italy and Spain.

When a medicine is exhibited in too large a dose it loses its peculiar effects and becomes a simple stimulant. If emetics be exhibited in too large a quantity in fever, they lose the effect of producing appearances of crisis after the vomiting is over. It is true,

true,

true, that when the dose is large, great part will be thrown up in the first fit of vomiting, but not till it has made an impression on the stomach, which does not go off when the remedy is thrown out of it, therefore large doses are less efficacious.

A grain of tartarised antimony, with from five to ten grains of ipecacuanha, is quite a sufficient dose.

In order to produce the full effects of an emetic in procuring the symptoms of crisis, it should be given to the patient in bed, that is when the disposition to general increase of secretion and circulation in the exterior parts may be aided by the equal warmth of the bed.

Although symptoms of crisis are produced most strongly by tartarised antimony and ipecacuanha, yet all emetics have the effect in some degree. Even if the feathered end of a quill be put into the throat, so as to irritate it gently, an attempt will be produced in the muscles of the abdomen,

domen, to contract and prefs upon the stomach, fo as to throw up its contents, and fome degree of nauſea will be brought on; but there will not be any contraction of the exterior parts, nor alteration of the colour of the ſkin, excepting in a very flight degree, and very momentary: and although after the vomiting is over there will be ſome glow of heat in the exterior parts, and diſpoſition to ſweat, yet they will continue for a very ſhort time, and ſecretions from the other ſecretory veſſels will not take place.

An emetic may be employed during the paroxyſm of fever, either in the beginning, middle, or towards the end. It may be exhibited immediately after the paroxyſm is over, in the middle of the intermiſſion, or in a little time before the paroxyſm takes place. Different effects will ariſe from the various periods of its exhibition, but theſe will be better explained in taking notice of the other remedies to be employed.

Preparations of antimony, ipecacuanha, &c. adminiſtered ſo as not to produce vomiting,
bring

bring on appearances similar to those of the crisis of fever.

Many have imagined this to be the effect of sickness, although vomiting did not ensue. This can only be determined by experiment.

The Author has frequently exhibited tartarised antimony to persons in perfect health, in such a manner that they were ignorant of having taken any medicine, neither did they feel the smallest degree of sickness, yet in about an hour afterwards the skin became softer and moister than it would have done under similar circumstances, if tartarised antimony had not been given; sometimes the person has been thrown into a profuse sweat, the mouth became moister, there has been a greater secretion by the kidneys and from the intestinal canal, and greater ease has been felt over the whole body. It cannot be said that these appearances took place from sickness, when the persons had not felt the least disagreeable

agreeable sensation in their stomach, or any other part of the system.

Where these medicines have been administered to patients afflicted with fever, and a crisis by their means has been produced, which would not otherwise have happened, the patients have frequently been entirely free from any feel of sickness and every kind of uneasiness about the stomach, yet the symptoms of crisis have begun in less than an hour after their exhibition.

When the stomach in fever will bear but a very small dose of these medicines without producing sickness; as a fifth or sixth part of a grain of tartarised antimony, for instance, the Author has rarely found that any critical symptom has been produced; on the contrary, when the stomach was able to bear as large a dose as half a grain of tartarised antimony without producing nausea, the symptoms of crisis have been produced in a short time. From these observations it appears then, that it is not in consequence

sequence of the sickness that these critical appearances are brought on, but that the medicine has another power of inducing such appearances totally independant of nausea.

It is entirely unknown how they produce this effect; it would appear however to proceed from some impression they make on the stomach; for their action is too quick to allow of their being carried into the blood vessels, commencing in many instances in half an hour or less, after the time of their exhibition. When any medicine gets into the stomach, and afterwards into the blood vessels, so as to be applied to any set of glands and produce evacuation from them, it is always after a much longer interval than five or six hours. Mercury, which gets into the blood vessels and stimulates the glands of the mouth, never produces greater secretion of saliva in less than twelve hours. Even purgatives, which perhaps pass directly from the stomach into the intestines, hardly operate in less than two hours; therefore medicines that com-

mence their operations on the glands in the body in less than an hour must be considered as making the impression on the stomach, and so producing their effect.

Another circumstance pointing out that these medicines do not act by being absorbed, carried into the blood vessels, and applied to the glands is, that tartarised antimony dissolved in water, and applied to the skin itself, is so far from producing softness of it, and greater secretion from it, that it produces contraction and dryness of the skin, and has all the other effects of an astringent topically applied.

Many other arguments might also be brought to show that these medicines have their effect upon the stomach.

These medicines then by the impression they make on the stomach, produce a greater secretion from all the glands of the body and all the secretory vessels, a softness and pliability of all the parts, a universal sensation of ease and tranquillity; in short all the appearances

pearances that take place in the crisis of fever. They often render the crisis perfectly complete when exhibited in the paroxysm of a regular tertian, and therefore not uncommonly terminate the disease in what would have been the first paroxysm of a tertian, if these medicines had not been exhibited, and so in any subsequent paroxysm.

In order to produce these effects the medicine should be given in as large a dose as the stomach will bear without producing sickness. That is, two sevenths of a grain of tartarised antimony, or a grain and a half of ipecacuanha, and other such remedies in the same proportion, should be exhibited at the beginning of the paroxysm and repeated in about three hours afterwards, the patient being kept in bed. If profuse sweating should take place, he should be kept in bed until it is entirely carried off.

Where a perfect crisis is not produced, continuing these medicines during the intermission produces beneficial effects, by taking off what remains of the paroxysm

during the intermission; and also by diminishing the force of the next paroxysm they tend to lessen the power of habit in producing subsequent ones. They should be exhibited so as not to occasion sickness, and may be repeated every four, five, or six hours.

When exhibited every six hours during the whole periods, they also often carry off the disease, the paroxysms after six or eight days not returning.

This practice is also advantageous, as by procuring more perfect intermissions food of greater nourishment may be allowed, medicines increasing the tone of the parts may be employed more freely, and more exercise may be used, so that these remedies may act with greater advantage.

Of the class of bitters, the powers of one are so preeminent, as perhaps to have brought the others into a conspicuous point of view. The bark of a tree which grows in the kingdom of Peru, is a powerful remedy in preventing the returns of a fever

fever generally; it has been called cinchona, from the name of a lady who has been supposed to have been the first who exhibited it, and this name has been adopted by the London College of Physicians. The jealousy of the Spanish government with regard to their American possessions and trade, has prevented the specific characters of this plant from being perfectly known, much less to allow seeds or plants of it to be brought to Europe.

The bark of this, as of other trees, consists of an internal part, having vessels which appear like fibres, but which carry juices for the nourishment of the plant. The exterior part consists principally of cells, containing the peculiar medicated juice, and is therefore the part to be employed in medicine, and is now indeed principally imported.

It has sometimes been thought that the bark from the small branches was more efficacious than that from the large. Sir

John Pringle obtained a quantity from the annual shoots, part of which the Author exhibited with very little effect. It would seem that more of the interior fibrous bark was formerly imported with the exterior cellular part when taken from the large than from the small branches of the tree, for now no difference is found between bark from larger or smaller branches, provided they have been of two years growth.

Three kinds have been imported lately; one of a rich brown colour, one red, and one somewhat more yellow than the ordinary brown: some practitioners have preferred one, some another; the Author has exhibited them alternately with equal effect, excepting that a smaller dose has been necessary, when they have been very perfect of their kinds.

All these, if perfect of their kinds, appear full of glittering particles, if broken and held in the sunshine, which appearance is lost if the bark be decayed, and is destroyed when a decoction is made from it,

it, which has sometimes been done without powdering it.

The cinchona has been exhibited reduced to a fine powder; infused in water, or boiled in water, and the insoluble parts separated and thrown away; digested in alcohol, or in mixtures of alcohol and water, the insoluble parts being rejected. The water of the decoctions and infusions has been evaporated, so as to leave the dissolved part of the cinchona dry, which has been called an extract; and the alcohol and water of tinctures have been evaporated, leaving what has been called a resin; or the remainder after evaporating both tincture and decoction has been taken, which is called extract with the resin.

It is certain that the powder is much more efficacious in preventing the returns of the paroxysms of tertians than any other preparation of this bark, whether it be that there are some menstrua in the stomach, which dissolve it more perfectly than water, or alcohol, or that it acts on the stomach in a solid form. This bark should be reduced
to

to as fine a powder as possible, both because the fine powder is more efficacious, and because it may be exhibited without producing nausea.

In some of the other diseases where the cinchona may be employed with advantage, the infusions, tinctures, and extracts, produce as much effect as the powder, but in all intermitting fevers the powder acts with very superior efficacy.

The powder has been objected to on account of its disagreeing with the stomach, and other forms have been recurred to as more agreeable to it, and to the taste. The taste of bark is less disagreeable than that of many other medicines, and provided it be reduced to a powder sufficiently fine, so as not to be felt gritty between the tongue and the palate, less objection is generally made to it in this state than in any other form. The greatest difficulty has arisen from practitioners themselves, who have suggested that it was unpleasant, and that they could find some more agreeable form; but where the necessity is urged, even patients who are

are prejudiced against it make no objection to taking the powder.

By what operation, or in what manner the bark of cinchona prevents the return of intermitting fevers, is an interesting subject of enquiry. To determine this question the Author has exhibited it to a man in health, to the quantity of an ounce in twenty-four hours, which is sufficient in many instances to prevent the return of a regular tertian, without any apparent difference taking place in the system. The blood on trial has consisted of the same parts and possessed the same properties as it did before the cinchona was exhibited; the secretions that could be examined have remained the same, and in the same quantity; the person has perceived no difference in any part of the system, has had the same appetite, the same sensations and powers of action. This medicine therefore produces no apparent effect on a man in health.

A much larger quantity of cinchona has been frequently employed in topical diseases, such as gonorrhœa, where the general
system

system has not been affected. The quantity even of two ounces in twenty-four hours, for a fortnight together, has been exhibited, without producing any difference in the chemical or mechanical properties of the matter of the body, or without producing any apparent effect, excepting relief in the topical disease. Therefore nothing tending to elucidate the effect of the cinchona, in preventing the returns of the paroxysm of fever, is to be found in administering it to persons in health, or affected with topical diseases.

Since the powers of cinchona have been discovered, other substances have been employed for the same purpose, such as the medicines already enumerated, which have the same kind of bitter taste, and are employed for restoring the tone; also preparations of iron, which have been supposed to have similar powers, likewise zinc, arsenic, &c.

Bitter medicines produce no effect when administered to a man in perfect health, and where the tone is already sufficient, unless

unless they have a mixture of some other medicated matter, such as camomile, which contains a stimulating essential oil, and orange peel, which contains an astringent matter. Nor is any effect produced from the camomile, if the essential oil be distilled away from it.

The return of the paroxysms of fevers have been sometimes prevented by these bitter medicines, although with much less certainty, or in other words, much less frequently than by the cinchona. The Author has actually prevented the return of the paroxysm of a tertian, by exhibiting camomile, wormwood, and gentian, to the quantity of two ounces, during the intermission, but they have much more frequently failed in their effect, that is, perhaps forty-nine times out of fifty, besides that their essential oils have considerably disordered the system. Preparations of iron, &c. appear to be somewhat more efficacious.

Preparations of zinc have in some degree the same power, and if exhibited in a
 quantity

quantity sufficient to prevent the return of the paroxysm, they have no effect in health, but their effects are not so well ascertained as those of bitters and of iron.

Preparations of arsenic and copper have also the power of preventing the return of the paroxysm of fever, but given in the same dose to a man in health produce great affection of the system; viz. violent pains in the extremities, and sometimes such affection of the stomach as to be fatal.

The principal reason for noticing these medicines is to show, that the cinchona is not the only substance which has the effect of preventing the return of the paroxysm, and that it has an action common to many other substances. What that action is cannot be determined, it is only known that it is more powerful in the cinchona than in any of the other substances acting in the same way. Copper, zinc, and iron, are more efficacious than the bark, in preventing the return of the paroxysm of epilepsy.

The next thing to be considered is, whether the cinchona has any power of taking off the paroxysm of an intermittent, which has already begun.

When the cinchona was first employed, it was exhibited just before the coming on of the paroxysm, and in some cases during the time of the first stage or cold fit. A kind of tradition has been handed down, that exhibited in this way, it had proved fatal in certain cases; perhaps, if it be true, it was when exhibited during the time of the first stage. This has deterred the Author from ever employing it during that time, as he does not think a physician justifiable in trying any experiment that has been conceived fatal, unless when it has been contradicted by other observations; but he has in many instances employed it from the beginning of the hot fit, or second stage of the paroxysm of an intermittent. In this case sometimes no effect whatever has been produced during that paroxysm, but it has gone on exactly as the paroxysm which immediately preceded; in other instances the
paroxysm

paroxysm has continued longer, and the crisis and intermission have been more imperfect; but he never met with a case in which the paroxysm stopped, or became shorter, or where the crisis was more perfect than was to be expected if no medicine whatever had been exhibited. A conclusion to be drawn from this is, that the bark of the cinchona, and probably all the medicines that act in a similar manner, have no power of taking off a fever when present, but only a power of preventing the return; or if they have any action on a fever when present, they tend to prolong it, and prevent a perfect crisis from taking place.

There appears no doubt but that the effects of the cinchona are produced by the impression it makes on the stomach.

About twenty years ago many very irregular and obstinate intermittents were found in labourers who had come from the fenny parts of Lincolnshire, and were admitted patients into St. Thomas's Hospital. These
intermittents

intermittents baffled the efforts of the physicians of the hospital, of whom the Author was one. The late Dr. Huck tried the various modes that had been recommended by authors for employing the cinchona. Among other modes of exhibiting it, half an ounce of the powder was sometimes given, in some cases an ounce, half an hour or an hour before the coming on of the paroxysm; in some instances the next paroxysm was prevented, in others it was not; the Author following his example, exhibited it in the same manner, and with the same effect. The success was so small as not to render it worth while to continue the practice, but it succeeded so often, however, as to ascertain certainly, that applied in this way it had the power to prevent the return of the paroxysm, if exhibited an hour before the first stage of the paroxysm would have taken place.

It is three or four hours after food is eaten before chyle can be formed from it, and be taken into the system. When the bark of the cinchona is exhibited in powder,

it is therefore not very probable that it should be any way so dissolved as to pass into the system, or be absorbed by the lymphatics in so short a time as an hour, and produce any effect on the fluids or any part of the system. It is at least very improbable that more than an eighth of the bark should be extracted and carried into the other parts of the system; but the eighth part of an ounce exhibited an hour before the coming on of the paroxysm of fever, or two, three, four, or eight hours, will hardly ever have the effect of preventing the return of the paroxysm of an intermitting fever.

It happens not uncommonly, that an hour after the exhibition of so large a dose vomiting takes place, and a great part of the powder is thrown up, often as far as can be judged almost the whole, yet in some cases the intermittent is prevented from returning; from which it may be concluded that its effects must have arisen from its operation on the stomach. However, there may be fallacy in this case, as an emetic
exhibited

exhibited just on the coming on of the paroxysm has prevented its taking place.

Another reason for believing the effect of the cinchona to be owing to the impression it makes on the stomach is, that no alteration can be discovered in the solids or fluids of the body, after it has been exhibited.

Supposing it therefore to be proved that the powers of the cinchona arise from the impression it makes on the stomach; the question is, how long does that impression remain?

When a medicine makes an impression on a part on which it can act, and which is called in consequence an irritable part, the impression remains much longer than impressions on the organs of the senses. When, for example, any stimulating substance, such as cantharides, is applied to the skin, so as to produce heat and redness, but not a permanent inflammation, which appearances continue, independent of the stimulus applied, the heat and redness do not go off in less than half an hour, which is much longer than

any impressiion remains on any of the organs of the senses, after the sensible object is removed.

The length of time the impressiion remains in preventing the return of the paroxysm of fever, when made on the stomach by the cinchona, has been proved to be considerable, by the experiments made by many physicians. The Author has tried it in several regular quartans where the intermissions lasted sixty hours, and the intermissions were perfect; a drachm of the cinchona given every hour for sixteen hours, at the beginning of the intermission, and discontinued for the last forty-four hours, has prevented in several cases the return of the fever. From this it is evident that the impressiion made by the bark on the stomach lasts at least forty-two hours.

A dose of bark therefore exhibited at the beginning of the intermission of a regular tertian will have such an effect as to tend to prevent its return. This medicine consequently should be exhibited during the whole time of the intermissions, as the impressiion

pression made by every dose will have an effect in preventing the return of the paroxysm.

It might be imagined that a small quantity of the bark of the cinchona might be exhibited at first, and in solution, so as to have the least chance of producing sickness and uneasiness of the stomach, and that if found not sufficient to prevent the return, a larger quantity might be exhibited afterwards; or that if a solution could not produce the effect; it might afterwards be employed in powder. But the Author has been led to conclude from many observations, that, if the cinchona be exhibited in such a manner as not to prevent the return of the paroxysms in the course of a few intermissions, its effect is generally lost, and that it never can be exhibited afterwards in any dose, or in any manner so as to produce its effect in the manner it would have done if employed in a proper dose and mode from the first. Frequently its power of preventing the return of the paroxysm is totally lost, and therefore it is of the utmost

importance to use it at the beginning in such preparations and quantities as to be effectual.

Where a first attack of fever goes through its three stages terminating in crisis, although not absolutely perfect, the bark of the cinchona may be exhibited immediately after such a paroxysm, and will often prevent the return of the fever. It is true that in such cases it is by no means certain, the fever would have returned; but as it most frequently does in cases where slight symptoms of the first stage remain, it is more advisable to give the patient the slight inconvenience of taking a small quantity of bark, than to hazard the risk of the return and continuance of the disease.

If a first paroxysm is gone through and very considerable intermission has taken place, and no means have been used to prevent a return; should another paroxysm succeed, terminating in crisis, although not quite so perfect as the first, still the cinchona may be employed without disadvantage,

tage, to prevent the return of the third paroxysm. It often happens, however, that the subsequent intermissions become less perfect, and the fever has acquired the force of habit; if the bark be exhibited during these imperfect intermissions, it will not with any certainty prevent the recurrence of the disease, so that where the first intermission is passed over, an opportunity is frequently lost of employing the cinchona with advantage for some time.

When an intermittent has begun with very little intermission or remission at the very first, and the intermissions have become gradually more perfect, and the cinchona has been exhibited before they have acquired a sufficient degree of regularity, its preventing a return of the paroxysm has been very uncertain, or if it should have prevented the paroxysm from returning for once or twice, the disease has often returned in five or six days, although the cinchona has been continued.

This is, however, a matter of great controversy among practitioners, some insisting that cinchona should be exhibited as soon as there is a crisis, however imperfect.

In a temperate climate, such as that of this country, and in a person of tolerable strength, either when the intermissions are very imperfect from the first, or when the first or second have been more perfect, and the exhibition of the cinchona in them has been neglected, it is better to wait till they become perfect before the cinchona is exhibited, even if it should be as long as eight or ten days. The cinchona, it is true, will frequently prevent the next return of the paroxysm, exhibited in any part of the disease; but on the other hand its force is often entirely thrown away by this imprudent use of it, so that it will not prevent the returns at present, nor afterwards cure the disease.

When the irregularity of the intermissions render the use of the cinchona improper,

proper, they may be rendered much more perfect by keeping the primæ viæ in proper order, by means of emetics and laxatives, and by producing more perfect crises by preparations of antimony, &c. By these means intermissions are frequently rendered nearly perfect after two or three paroxysms, that would have remained as many weeks imperfect without them; besides, there is a chance in this case of removing the disease entirely by these remedies.

When a tertian has continued regular during two or three months and the cinchona never has been exhibited, and has become imperfect again; although the intermissions have been very irregular, the Author has found the cinchona efficacious in preventing their return.

With regard to the exhibition of the cinchona, it has already been said that it should be given in powder. Where there is perfect intermission at the beginning of
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the disease, the opportunity should be seized of employing it without any previous medicine being exhibited whatever, so as to prevent the disease from being fixed by habit.

If the intermissions should continue tolerably perfect after the second, it is always better to clear the primæ viæ by an emetic and laxative, such as rhubarb, before the cinchona is exhibited; the time of one paroxysm only is lost, and the remedy is rendered much more certainly efficacious.

Where the intermissions have been very imperfect from the first, or have become so afterwards, and then have grown naturally more perfect, the emetic and laxative should also precede the exhibition of the bark of the cinchona.

If the intermissions have been rendered more perfect by these means, the cinchona may be immediately employed without any other previous remedy.

If the intermissions should have become more imperfect again late in the disease, it is also proper to employ means of clearing the primæ viæ, before the cinchona is made use of.

When according to the above rules it is proper to employ the cinchona, a drachm of the bark of it reduced into very fine powder should be exhibited and repeated every two hours at least. Most stomachs will bear this dose; if it will bear a larger, two drachms at the end of every four hours would be preferable. This exhibition of the cinchona should not be interrupted during the intermission, therefore, if the patient falls asleep, he should be awakened at the proper time for taking it.

The cinchona should be continued till within an hour of the time of the coming on of the next paroxysm; that is an hour before the first sensible appearances of the disease take place. Should no appearance of the disease arise, it is to be omitted during the
time

time that the next paroxysm would have taken up. For if this remedy has had sufficient efficacy during the time of one intermission to prevent the return of the next paroxysm, it will certainly, during the term of the following intermission have power to prevent the subsequent paroxysm. In a regular tertian this always is true; how far it holds in fevers of other types will be treated of in the dissertation upon them,

By this means the stomach has time to clear itself totally of the former dose before a fresh one is taken, and the sense of weight and uneasiness arising from large and frequent doses has time to go off.

If no traces of the paroxysm have appeared, the stomach is left capable of digesting the food exhibited during this interval, or if the patient's sleep has been very much disturbed, time is given for repose.

Although

Although a paroxysm of an intermittent has been prevented by the cinchona, it frequently happens that, if no medicines be employed, some slight appearances of a paroxysm will take place about the time the disease should have recurred.

When slight symptoms of the attack of fever, such as languor, pain in the small of the back, pain in the forehead, take place at the time the paroxysm should have recurred, subsequent to that which was prevented by the cinchona, these symptoms increase for the three or four times that would have been the times of the paroxysms, and at length a complete paroxysm recurs, and the disease proceeds as if it had never been prevented.

Several means have been employed to prevent this reproduction of the disease. The first and most efficacious, is to continue the use of the cinchona, by employing it in the same dose as at first, at the time that would have been the time of the intermission after the paroxysm that was prevented by it, employing it as frequently as during the
time

time of the first intermission. It should be discontinued at the time when the subsequent paroxysm should have recurred; and the same practice should be repeated during the time of the next intermission. That is, if the tertian had commenced at twelve at noon on Sunday, and had compleated its stages by midnight, a drachm of the cinchona should be exhibited at one on Monday morning, and continued every two hours till eleven on Tuesday morning; it is then to be omitted till one o'clock on Wednesday morning, when it is to be given in like manner till eleven o'clock on Thursday morning; it is then to be omitted till one o'clock on Friday morning; it is then to be exhibited till eleven on Saturday, and afterwards discontinued altogether for a time.

Many practitioners deny the necessity of this long use of such a quantity of cinchona, having frequently cured their patients in a shorter time, and with much less doses; but they have also very frequently failed. This failure is usually attributed to the badness of the cinchona, to
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the particular constitution of the patient, relapses produced by new causes, and a thousand other things; but the Author is convinced from his frequent trials of it in all ways, that in order to ensure success it must be exhibited as above directed.

This even is not sufficient to ensure success perfectly, but an ounce should be exhibited during the day time at the end of six days for two days; and again in the same manner after an interval of six days more.

The Author cannot help again repeating the necessity of exhibiting the cinchona in this manner, having been so often disappointed when it was otherwise used, and having so frequently found that this medicine having once been given so as to have failed in its effects, generally loses the greatest part of its efficacy in afterwards preventing the return of the disease.

If the bark should affect the intestines as a purgative, it is a common and proper practice

practice to exhibit opium to prevent this effect. The opium ought to be employed so as to act on the intestines constantly and with efficacy, a third part of a grain, or its equivalent in any of its preparations, should be given, and repeated at the end of every sixth hour; it may be mixed with the dose of bark which falls in with that period.

When on the other hand the peristaltic motion of the intestines is prevented from going on, the natural evacuations ought to be produced by rhubarb, or some other gentle laxative, as purgatives ought by no means to be exhibited so as to make large evacuations.

Another means of preventing the returns of the paroxysms, is by producing a profuse sweat at the time that the paroxysm should take place.

A variety of modes of producing this effect have been attempted. The most efficacious means is to exhibit a spice of
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some kind, opium, and tartarised antimony, or any other efficacious antimonial preparation; wine or spirits with opium, volatile alkali, and ipecacuanha, the formulæ of which are in the Author's Elements of the Practice of Physic.

These medicines should be given about an hour and a half before any sensible appearance of the paroxysm is expected; the patient should be in bed in cotton or flannel, and in this climate the room should be heated in winter to 55° , in summer to 73° or 74° ; warm watery fluids, such as barley-water, should be exhibited to the quantity of two or three ounces every five or ten minutes, and in such manner, as that the patient should not be obliged to raise himself from under the bed-cloaths, from the spout of a tea-pot for example. The head should be bound round with cotton or flannel, more bed-cloaths should be used than the patient is commonly accustomed to. If by these means a profuse sweat can be produced at the time when the paroxysm of the disease should have come

on, none of the symptoms of the attack make their appearance, and in several instances the paroxysm is entirely prevented.

Exhibiting some very stimulating purgative, which affects the whole system, about ten hours before the use of these remedies, renders them more efficacious. Such as a mixture of scammony, coloquintida, aloes, and jalap, given so as to produce five or six evacuations; and so as that their purgative effects shall be entirely over by the time the sudorific remedy is to be employed. The advantage of such purgatives is from the disposition they leave, after their purgative effects are over, to sweating, even when no sudorific remedy is made use of, and consequent increase of the power of the sudorific. Purgatives were originally exhibited with a view of evacuating noxious matter, which effect however there is no reason to think is produced by them.

It is as little understood how the disease is prevented by these remedies, as by the use of the cinchona, or any other remedy acting in the same manner.

Whether

Whether this practice might be used advantageously is not known where the first and second intermissions are perfect, and the subsequent ones become imperfect. Where the first and second intermissions have been tolerably perfect, and the subsequent ones for some time have become imperfect, it cannot be employed with advantage while they are very imperfect. Where the intermissions at the beginning are nearly perfect and continue so; and where they are imperfect at first, and afterwards become perfect, or nearly so, these sudorifics may be used advantageously. There is one exception, however, when towards the beginning of the disease appearances of general inflammation should arise, such as hardness, fulness, and strength of the pulse during the intermission, there is some doubt whether they have not a tendency to produce topical inflammation: this is however merely a theoretical idea, as there is no proof of deleterious effects having arisen by the use of them under these circumstances.

When inflammatory symptoms about the thorax continue during the intermission, such as considerable difficulty of respiration, violent cough, pain in the side, with hardness of the pulse, hæmoptoe is apt to be produced by them.

When the intermissions become again imperfect towards the end of an intermittent, after having been perfect or nearly so, this remedy may in several instances be efficaciously employed.

A sudorific remedy is rarely efficacious when it does not produce sweating at the time the paroxysm should have recurred, sometimes however it does even in this case prevent it. This shows that it is not merely sweating that prevents the paroxysm from returning, but that the sweating is perhaps only a collateral effect of the medicine, and a sign of its acting thoroughly and efficaciously.

On the other hand, although sweating should be produced, it sometimes happens that

that the paroxysm takes place, the sweating ceasing at the time of or soon after the attack, and during the hot fit, which however is generally very much shortened; in many cases, the crisis which follows is rendered more perfect, and the whole disease goes on with a milder aspect.

It might be supposed that by repeating this remedy in the next intermission, where the paroxysm has not been prevented, the following paroxysm might be prevented. This happens sometimes; the patient however is so much exhausted by these great exertions, especially if a stimulating purgative had been made use of, that it is not proper to employ it, at least in the subsequent intermission. If the purgative had not been given, it may be used in the following intermission, so as sometimes to produce an effect, and prevent the next paroxysm from returning.

The exhibition of a sudorific remedy in this manner has not been much practised. It is one of the modes that have been used to prevent the return of fever, which some-

times succeeds, although not so frequently, as to put it into competition with cinchona, where it can be employed properly.

Antispasmodics, such as musk, opium, empyreumatic oil, æther, &c. exhibited just before, or at the time of the coming on of the paroxysm, sometimes prevent it, without proving at all sudorific, but so seldom as not to be worth serious attention.

Another means of preventing the paroxysm from taking place is to excite some passion, of the mind very strongly, of the success of which there are instances, although few: one, for example, was of a patient, a man in the twenty-ninth year of his age, in the third month of a quartan, where the intermissions were regular, and took place at two o'clock in the afternoon, and in the winter. His brother led him to walk by the edge of a mill-dam and pushed him suddenly in, which produced great terror, as he was unable to swim; he was taken out, however, that paroxysm was prevented from taking place, and no farther attack of the disease arose.

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By exciting inflammation of the skin in any part of the body, so that the inflammation may be considerable at the time the paroxysm should take place, it is sometimes prevented and the disease cured. Hence bracelets of mustard-seed and garlic have been applied to the wrists and ankles, which sometimes have had an effect. Similar remedies are however so seldom efficacious that regular physicians have rejected them, empirics have sometimes employed them, and when they do chance to succeed in their hands, are supposed by the vulgar to have a miraculous effect. Sudorific remedies exhibited just before the coming on of the paroxysm have been ranked with these very uncertain remedies, which they by no means deserve, being next after the cinchona, and other medicines of the same kind, the most efficacious that can be employed.

Sudorifics are however not to be put in competition with the cinchona, where it is proper to exhibit the latter. But supposing the intermissions not quite so perfect as to render it prudent to employ it, or supposing that

that it has been employed improperly, so as to have lost its effect, sudorifics are then of great value, because if they should not absolutely prevent the return of the paroxysm, they often render the next intermission more perfect, so as to bring the patient into a situation in which the cinchona may be exhibited with advantage.

These are the remedies which have been employed to prevent the return of the paroxysm of a regular tertian; that is, first producing so perfect a crisis, as that no symptoms of the first stage shall remain after it has taken place, in which case it often happens that no subsequent paroxysm takes place; secondly, employing the bark of the cinchona, or other medicines, which, exhibited during the intermissions, prevent the return of the paroxysm, without having any other sensible effect on the system; thirdly, employing medicines just before the paroxysm takes place, which throw the patient into a profuse sweat, which, if it should take place just at the time of the coming on of the paroxysm, prevents it from
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coming on at that time, and often carries off the disease; fourthly, employing anti-spasmodics at the time of the attack, or during the paroxysm, which prevent or diminish it; fifthly, exciting inflammations, which sometimes prevents the paroxysm from taking place.

Those remedies remain to be examined which appear not to have a beneficial effect.

The first of these is evacuation by bleeding; a powerful remedy in many diseases, but in a regular tertian intermittent, it has not the least effect in preventing the paroxysm from taking place, rendering it more regular, inducing more perfect crisis, or rendering the intermissions more perfect.

There seems to be a great error in the view of remedies employed in fever; practitioners frequently making no distinction between those used to cure the disease itself, and those employed to remove accidents that have arisen in it, although such distinctions are extremely necessary to be made. If, for
example,

example, in the course of a tertian a pleurisy should happen to arise, taking away a quantity of blood would be a powerful remedy for the pleurisy; but although the pleurisy were removed, the intermittent tertian would go through its course just as if no blood had been taken away, excepting that the patient would be rendered weaker.

Those who are uninformed in medicine, expect that diseases are to be cured by violent remedies and suddenly. The attention of by-standers is often drawn to practitioners who employ strong acrid medicines. This has frequently induced those practitioners who are least acquainted with the real history of diseases, to use the most violent medicines in their apparent effects, supposing that they would also be the most efficacious in curing the disease; while practitioners really well informed find it often much more proper, to leave diseases to go through their natural course, while they are careful not to let slip an opportunity of employing a remedy that is efficacious in carrying them off.

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This subject will be more amply treated of in the dissertation on the management of regular continued fever.

Purgatives have often been employed in regular tertians, with a view to carry off certain humours supposed to occasion the disease. But it has been found, on the other hand, that purgatives have reproduced the disease, after it has been carried off by other remedies ; and that, excepting so far as they prevent costiveness, excepting also the use of stimulating ones, to assist the action of sudorific remedies, they tend to render the disease longer in its paroxysms and the crises less perfect.

Evacuation, either by bleeding or purging, is hurtful, in so far as it weakens the patient, and renders him less able to bear the repetitions of the paroxysms, and on this account are improper, although not so highly prejudicial as in continued fever, for in the intermissions there is time for food to be digested, so as to replenish the blood vessels.

In this Dissertation the ground gone over is trodden and tolerably plain, the remaining parts of the subject are more difficult; the Author nevertheless means to pursue them, according to his ability, until the history of fever be compleated by a third dissertation, viz. on a regular continued fever; a fourth on irregular intermittents, and the accidents which happen in them, and the last will contain the history and the manner of treatment of the accidents which happen in continued fevers, and their irregularities.

FINIS.