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LECTURE ON THE NATURE & TREATMENT OF CHOLERA,

CONSIDERED WITH REFERENCE TO ITS

ANALOGY WITH CONGESTIVE AGUES OF QUOTIDIAN TYPE.

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GENTLEMEN,—

Both as students of the science of medicine, and as professors of the healing art, we are all at present peculiarly interested in investigating the nature of cholera. Thirty-two years have now elapsed since that fatal disease first became known to our countrymen in India, and through them to the inhabitants of other countries; but it was long regarded by the nations of Europe and America, as belonging rather to another world, than as ever likely to become personally interesting to themselves.

It was only on its actual appearance among us in 1832 that we became convinced of our mistake, and were thrown into all the consternation that attends a mysterious and unexpected object of terror. At that time every human attempt made to arrest its progress proved in vain; and, setting almost every variety of climate at defiance, cholera completed the wide circuit of the world.

No sooner, however, was the danger past, than we relapsed into our false notion of security, until this was again dispelled by appalling accounts of its renewed progress through Asia, and of its having again passed the boundary of the Caucasus, invading Europe by the identical route which it had followed seventeen years before, with no other difference than that its front was now more extended.

It might reasonably have been expected that, after the disease had extended itself over nearly the whole globe, and the press of every country had absolutely teemed with essays upon the subject, some definite agreement would have been arrived at by the profession with regard to its essential nature, and to the

principles upon which its treatment should be conducted. It is, then, little flattering to our professional pride, to be obliged to acknowledge that this expectation has been disappointed.

The medical press gives almost daily evidence, that little information of importance has been added to that which had been collected by the earliest observers of the disease; our practice is still almost entirely empirical, the principles on which it should be conducted are as little determined, and the opinions of the profession as little settled as they were on its first visitation.

Even the great question of the capability of cholera being communicated by contagion, is still a moot point, and all the evidence collected on the subject is insufficient to convince our legislature that quarantine regulations in regard to it, are only a useless and cruel grievance. Under such circumstances, and after many of the first medical authorities of the past and present generation have failed to elucidate its nature, it is only natural that every new attempt to throw light upon the subject should be received with distrust, and that any one who now ventures on the discussion, will do so at considerable risk to his professional reputation; I cannot, therefore, but feel much diffidence in doing so, and that much apology is due to you for requesting your attendance here for that purpose.

My reason for making the attempt is, simply that I believe the circumstances under which I have had an opportunity of studying the disease have been peculiar, and such as to lead to conclusions of great importance, and that I should be acting little in unison with the spirit of our profession, and be neglecting a great duty, if I failed in laying that information which chance has accorded me, before its members. I may, it is true, have overrated the value of my opportunities (this is for you to judge,) but believing, as I do, that what I have witnessed, if fairly set forth, will lead to the determination of a *principle*, rather than a rule of practice, I have felt it imperative on me to submit the subject to your consideration, in the same light in which it had appeared to myself.

After becoming acquainted with cholera, under very favourable circumstances, in Edinburgh, in 1832-3, and in London, in 1833-4, it was my lot to be stationed for several years in Persia, a country, situated both geographically, and in point of climate, midway between India and Europe, and there I had the opportunity of observing closely the first approaches of the identical cholera, which is now sweeping irresistibly towards us.

The disease was there ushered in by a regular succession of epidemics, commencing in a fever apparently continued, but by and by assuming more the character of a remittent, and this very gradually changed to an intermittent of quotidian type; of this the cold stage gradually became prolonged, and assumed all the appearances of an attack of cholera, and then came the cholera, as it has everywhere been known, without any *obvious* stages or intermission. This again in its turn disappeared, and the epidemic resumed the character of remittent and continued fever for a time. These various changes occupied a period of eighteen months.

Having thus witnessed the disease analysed and dissected as it were, into its component parts, and seen continued fever gradually resolve itself into cholera, and cholera into continued fever, by slow gradations, in a manner which does not appear to have ever been presented with the same perspicuity to any author, having, too, been obliged to follow each varying type of that epidemic with appropriate treatment, I have been led insensibly to those views of the nature and treatment of cholera, which I shall endeavour to submit to you, as shortly as may consist with my intention of leading you into the same train of reasoning which I myself pursued.

By considering this fatal disease rather as an exaggerated example of others better known, and whose treatment is more familiar to us, than as something anomalous and unlike every other disease, we shall, I trust, escape the necessity for vainly searching for some principle capable of reconciling modes of treatment so much at variance as hot air-baths and warm stimulant potations on the one hand, and snow-baths and iced-drinks on the other. *Æther*, alcohol, tartar emetic, calomel, lead, lunar caustic, croton oil, naphtha, assafoetida, quinine, opium, peppermint, bleeding, blistering, and the actual cautery, are only a few of the remedies that have been proposed for the same stage of the same disease, all equally failing—all equally recommended as infallible.

Still, there is one valuable conclusion to be drawn from the very contrariety of the means employed, viz., that almost all have felt that the more obvious indications (which the well-marked symptoms of cholera would lead us to follow,) are not to be trusted as guides in the treatment of the disease; that some broader principle is necessary to direct our practice than the fallacious one of opposing the cold of the body by external heat, the collapse and sinking of the vital powers by stimulants, or the purging and muscular spasms by opium. Indeed, the abandonment of this method of treating symptoms, and the loss of faith in heat and stimulants are what chiefly distinguish the more recent works of experienced authors from those of more ancient date, and of less practical acquaintance with the disease.

In concluding these prefatory observations, I beg to remark, that I have endeavoured to avoid discussing the opinions of others, because this is unnecessary to the audience I am addressing, who are not only well acquainted with the works of the best authors on the subject, but also possess a large amount of unpublished

knowledge of the disease from their own practical experience.

The similarity of cholera to the cold stage of ague is too obvious not to have occurred to many, but there were, unfortunately, two circumstances which contributed much to prevent this analogy from being pursued to its full extent—the first being the want of any *obvious* stage of reaction, relaxation, or intermission; the other, that quinine and arsenic were not found effectual in the treatment.

It was observed that recovery from the cold stage of cholera in this country, was not unfrequently followed by a low form of continued—I should rather say remittent-fever, and this, instead of being regarded as one of the modifications of the disease, induced by climate, or, as a secondary effect of primary disorder, was considered by too many as the hot fit which belonged to the protracted cold stage that had preceded it.

I shall endeavour to point out that this form of fever not unfrequently precedes and follows cholera as an epidemic, even at long periods, before and after the appearance of the major malady, and sometimes occurs as its substitute; and that while it prevails in a country, the “epidemic constitution” to which it belongs, more or less influences the course of almost every other form of disease, by producing a greater than usual tendency to venous congestion, and diminished or irregular action in the capillary circulation; and that the type of sporadic fever in this country has for several years approached very nearly to this, especially in the last few weeks;—as also in Edinburgh in 1843, in Liverpool in 1844-5, and has been more particularly displayed in those cases of fever that have arisen spontaneously from putrid vegetable matter.

Finally, I hope to convince you that the alliance of cholera with other diseases, of which quotidian periodicity is a marked characteristic, gives us reason to believe that even when apparently most destitute of regularly recurring periods, it is not utterly so in reality. That it is, in fact, by considering cholera as an aggravated congestive ague of quotidian type, that we shall most nearly arrive at just principles on which to conduct its treatment, and that the means by which cure is effected in the one, are both theoretically and practically those which are most appropriate to the other.

DISTINCTION BETWEEN MALARIOUS AND CONTAGIOUS FEVERS.

Before we enter on the consideration of those diseases with which cholera is allied, and of which class it may be considered one of the extremes, it will be well to devote a few minutes to consider the broader points of distinction between this class and those diseases which are communicable by contagion.

By active disease, we mean either the direct effects of toxical or mechanical injury to some portion of the system, or the indirect effects produced by the resistance opposed by the vital powers to the operation of such causes—or, lastly, the effects of the struggle between the noxious influence and the *vis medicatrix*.

Fever is the most obvious and most frequent evidence of the activity of the vital powers to resist a noxious

influence, and of the attempts of the powers of life to repair the effects or remove the cause of injury; but in considering fever in general, it is usual to limit the term from its wider sense to that condition which follows the absorption of certain poisons into the blood. When, therefore, we find fever to be the consequence of absorbed poison, it is of the utmost importance to endeavour at the outset to ascertain, as nearly as we can, upon what part of the system, and in what manner the effect is produced, and what are the actions by which its influence is resisted.

That the cause of both contagious and sporadic fever is introduced into the system by the blood, few indeed doubt; but the important question is, does the cause produce its effects directly on the blood itself by essentially changing its constitution, or is it only conveyed by the blood, like digitalis, aconite, opium, &c., and without causing any essential change upon the blood, operate by affecting the nervous system?

In an admirable essay on "Spotted Typhus," read before the Provincial Medical Association in August, 1848, Dr. Davies, of Bath, drew a broad distinction between the two classes of poisons which are known to produce fever, viz., animal poison, and malaria. There is one kind of poison, he said, which, arising in the blood, and finding the elements of its reproduction in the blood of another, produces a fever capable of being propagated from man to man; and there is another class of poisons, which, arising in elements extraneous to the blood, does not find its elements there, and though it produces fever, cannot reproduce itself, and is not capable of being propagated from one to another.

The second class is that which is now to occupy our attention, at least, that portion of it which embraces fevers produced by malaria, whose characteristic is periodicity,* and I shall venture to enunciate the proposition with regard to these even more broadly:—That although the first class of poisons—that, namely, which produces the exanthemata,—operates on the blood and changes its constitution, the second operates not on, but through, the blood, and produces its effects by its agency on the sympathetic system.

Both classes no doubt produce effects on the sympathetic, but the first, (the animal poison,) acting by a continuous irritation, produces a persistent effort of the emunctuaries to remove the poison from the blood, or continued fever; the second, (malaria,) acting solely by nervous impression on the sympathetic, produces merely a struggle between the impression which is opposed to vitality, and those sensations and actions that are provided for the maintenance of animal life. This struggle is what we observe to take place in the intermitting and congestive fever, &c.

If malarious poison actually changed the constitution of the blood, it would be as impossible to cut short a fit of ague as an attack of small-pox or scarlatina;

but it is possible to cut short an ague, by means which (as we shall see when we consider the treatment of intermittent,) are not one of them calculated to produce an essential change on the blood itself. There would, too, in all probability, be some evidence of an elimination of the poison by the fit, as by the skin in the exanthemata, which there is not; or some difference in the blood drawn several hours before and after the fit; but in both cases it is equally incapable of propagating the disease by inoculation. Besides, it appears scarcely possible to account for the leading characteristic of the whole class of these fevers—their periodicity—on any principle but by the law of nervous impressions,—viz., that long-continued impression of an object upon a nerve of sensation impairs its sensibility, but that a change of impression restores it; as the eye long fixed upon a point becomes insensible to the impression of light, but recovers its sensibility on being turned to other objects.

So the continued impression of the poison on the sympathetic subdues its sensibility to its appropriate stimuli,—namely, that excitability which resides in the vital organs, whose action the sympathetic governs and regulates, but its irritability becomes re-excited, and its energies are restored by the new impression caused by change from a natural to a disturbed condition of the organs, which is the consequence of the withdrawal of the influence that combines and regulates their functions. Like the eye, restored to a sensibility to light by change of object, where the energy of the sympathetic is thus restored by the new impression, the recovery of its natural sensibilities would be permanent, were it not again submitted to the same influence by which it had been paralysed at first; but as the optic nerve will again become insensible when the gaze is again fixed as before, and this sooner or later, as the object is more or less illuminated, so does the sympathetic require to be again undisturbedly submitted to the noxious impression after recovery of its sensibilities before the effect is again produced, and that for a longer or shorter time, according to the power of that impression.

If we shall see reason to believe that the effects of the malaria under consideration are not caused by actual change operated on the blood, it will be evident that they can only be produced through the agency of the sympathetic, for we shall have frequent examples of malaria, affecting at one time the circulation merely, as in ordinary ague; at another only the bowels, as by diarrhoea or nervous constipation; at another the cerebro-spinal system, with convulsion, paralysis, or neuralgia; or, again, we have either two combined, or all three, as in cholera; and we know that with the exception of the blood, there is no other element in the system but the sympathetic, which is in such intimate contact or connection with the organs of circulation, of digestion, and with the cerebro-spinal nerves, as to be capable of producing these effects.

We find, too, that what we should expect from our acquaintance with anatomy, really is the case,—viz., that the capillary circulation is the part of the system, which most frequently, most easily, and most completely, submits to the influence of malaria acting

* Some malarious poisons do undoubtedly contaminate the blood itself, and require special action for their elimination, as the Egyptian plague by boils; but these form a distinct genus of contagion, and do not fall under our immediate consideration. Those now to be discussed are all characterized by intermitting action till they reach their climax in cholera.

through the sympathetic, because almost every other part of the system,—the heart, stomach, lungs, viscera, &c., are all supplied by other nerves, the capillaries alone depending entirely on the agency of the sympathetic, whose branches are distributed to every, (even the minutest,) vessel in which our instruments enable us to trace it. This view is further borne out by considering the change from the healthy functions of this part of the system that are manifested when influenced by the morbid impression. In a state of health we know that certain chemical reactions take place between the blood and the terminal structures of the capillaries, by which perpetual slow absorption and deposition of the tissues, is effected, certain secretions are produced, and animal heat is evolved, and that while those actions go on undisturbed, the blood flows freely and unimpeded through the gently distended, but still very minute, veins, without exhibiting the least tendency to adhere to them, as would be the case in inanimate capillary tubes of equal diameter; neither does the contained blood exhibit any tendency to coagulate. We know that this property of preventing capillary adhesion of the blood to the coats of the vessels, and of preserving the fluidity of the blood, is peculiar to the living inner coat, and not to living structures generally, for extravasated blood, in whatever part of the body, immediately coagulates. We are also aware that the capillary circulation possesses local excitability, (independent of the heart,) and the power to resist injury or repair its effects, and that excitability is a reflex action, commencing in sensibility, therefore that this latter quality depends upon the nerves of the vessels.

To prove that all these qualities are bestowed by the sympathetic nerve would lead us too far from our present object; suffice it to remark, that the first stage of ague and cholera is marked by diminution, or cessation of all these qualities and actions. Of the effect of this on the change of the tissues we have little evidence, but we see secretion stopped and converted into exudation, which physiology teaches is directly the opposite of vital action; the evolution of animal heat ceases; the veins contract like those of the dead body; the blood returns from the terminal structures in a condition very different from that of health—not coursing freely through the vessels, but slowly, and as if adhering to their coats, and in a half coagulated state; and, lastly, by the application of stimuli, which would produce immediate reaction in the healthy skin, we find it almost impossible to excite these vessels in cholera. The direct conclusion from all this is, that impaired excitability, nervous energy, and vitality of the capillary circulation, is the first and most essential effect which we perceive of the impression of ague or cholera, and that the change produced upon the blood is more probably the secondary effect of the cessation or diminution of those changes which are produced upon it in the capillaries of the lungs, and of the system in health, than in any way attributable to direct influence of the poison on the blood. In the whole class of diseases now under consideration, we shall find evidence of disorder of the sympathetic system in one or more of its vital functions, displayed either in the

capillary circulation, the digestive, or in the cerebro-spinal system; but in not one of them is any conclusive evidence to be found of a poison eliminated from the system by the fit, in any way resembling that which is thrown off from the blood in fevers produced by animal poisons of the class exanthemata, nor can we conceive any source of constant and universal irritation to the constitution, such as would result from essentially diseased condition of the blood, to be characterized by intermissions, or to be capable of cure by means addressed to the mere interruption of periodicity. In such a case, on the contrary, we should expect only a continued and persistent action, till the end to be accomplished by the elimination of the poison is attained. Moreover, if it be granted that continued fever is the effect of a constant source of irritation existing in the blood, it would appear to be a corollary to the proposition that intermittent, as opposed to continued reaction, is direct evidence of the absence of a source of irritation in the blood, and produced by means diametrically opposite, which we have fair grounds for concluding to be the absence of that irritability in the very structures which become excited by a source of irritation existing in the blood in continued fever, or by their natural stimulant in health, viz., distension by the *vis a tergo* of the heart*.

On these grounds, considering simple ague as the type of the whole class of diseases which we are about to study, we shall proceed to examine its symptoms and the indications for treatment.

SYMPTOMS AND TREATMENT OF INTERMITTENTS.

Intermittent fever has been generally described as consisting of a cold stage, with shivering; a hot or febrile stage; and a stage of perspiration and relaxation, followed by intermission. This description cannot, however, be received as a definition, because of these stages there is only one that is constant,—viz., periodical return of the cold stage, while the febrile and sweating stages are only the consequences of subsequent reaction and relaxation, and sometimes they are altogether absent. But shivering is by no means an essential to the cold stage; on the contrary, in the most dangerous forms of ague, shivering is often absent, as it is in cholera, because the disturbance of the circulation in the cold stage is such as to overpower this symptom.

Shivering may practically be considered not so much a symptom of the impression of cold on the body in health, or of the cold stage of ague, as an evidence that reaction is taking place in the system, and that the heart possesses the power to overcome the obstruction opposed to its action; it is, in fact, the first step of the febrile stage, and in the more malignant forms of ague, is the surest harbinger of recovery, and the best evidence of reaction.

* The above reflections may serve to suggest the question to physiologists,—whether the circulation of the blood by successive pulsations of the heart instead of by a continuous action, may not be a wise provision of nature to avoid the exhaustion of nervous sensibility in the capillaries by continued impression.

In the medical treatment of ague, little is generally attempted in the cold stage beyond giving a stimulant diaphoretic, or in the febrile beyond cooling diluents. It is customary to trust entirely to the means of prolonging and confirming the intermission by the use of antiperiodic medicines. But this routine method of treatment is not applicable in all agues, for these differ materially in the urgency of their symptoms, according to their various types, and the duration of their period of intermission.

Thus, both in quartan and in tertian ague, febrile reaction generally runs so high as to cause this stage to be most dreaded by the patient, and the congestive stage is of comparatively little moment, being accompanied with shivering almost from the first; but in quotidian the case is very different, the fever, where it exists, being slight and of short duration, and both this and the sweating stages often absent or imperceptible, and the interval between the fits is sometimes so short as to be insufficient to restore natural irritability to the system by repose. The congestive or cold stage is, on the other hand, extremely severe, and such as to endanger the vital organs, and even to give rise to the dread that the attack may prove fatal before it reaches the stage of reaction. In such a case, then,—and such it will appear is cholera,—not fever, but the opposite condition, is to be feared, and all our efforts must be directed to obviate or relieve congestion.

There cannot be a doubt that this is the most essential part of cholera, and the great source of danger in congestive ague; we shall, therefore, devote the remaining portion of this lecture to the consideration of the congestive stage in its cause, course, symptoms, and effects, and to the mechanical means of relieving and curing it, whether natural or artificial, reserving what we have to say on the medicinal part of the treatment for a future lecture.

It is customary to date the commencement of a fit of ague from the commencement of shivering, and of cholera from the first purging, but this is an important error, for long before this symptom comes on, a certain shrivelled appearance of the skin may be observed; the expression of the eyes changes; there is a feeling of malaise and confusion in the head; the nails look blue and bloodless, and are marked with a red and white streak, and there is a tendency to yawn, and a feeling of oppression about the heart, accompanied with sighing.

The essential part of ague has begun, perhaps, as much as two hours before the shivering occurs; the blood is gradually forsaking the extremities, and is driven in upon the heart more quickly than it can be sent through the pulmonary circulation, whose capillaries also resist the free transmission of blood; it therefore accumulates in the great veins, so that a great part of that fluid which a short time before was circulating in the extremities, being now rejected by the capillaries, is forced to find room in the venous reservoirs, and great vascular organs of the chest and abdomen, while the arterial system is left comparatively empty.

The consequence of this congested condition of the great veins is the disturbance of the circulation in the

thoracic and abdominal viscera, and oppression of the action of the heart. This disturbance of function produces an excitement in the organs themselves (that is, upon and through the sympathetic nerves,) to resist oppression, by increased efforts to preserve life, or what is called reaction. When this effect is felt, the whole frame partakes of the influence, and manifests it by convulsive shivering. The struggle of the powers of life against the disturbed or oppressed action of those organs whose office it is to sustain life continues, till at length the highly-excited powers of the heart and arteries overcome the inertia of the capillary circulation, and the blood once more courses freely through the veins. But this excess of action does not immediately cease with its victory, a period of fever succeeds, till at length, exhausted, the capillary circulation becomes relaxed, perspiration bursts from every pore, the excitement of the heart subsides, and the circulation returns to its natural condition for a time. This period of repose is not, however, permanent; by and by the capillaries again succumb to the effects of renewed impression, the same effects are produced as before, and the same struggle ensues. The duration of the cold fit depends upon the susceptibility of the sympathetic, to be sooner or later roused to perception of the disturbance of the vital functions which is taking place, and on its ability to excite the organs of circulation to more healthy action, for according to this will the struggle be more or less severe and protracted, and in like manner the severity of the congestion and abridgement of the period of intermission will be in proportion to the power of the impression to produce the paralytic condition of the capillary vessels by its agency on their nerves, till the climax is reached in cholera where intermission is either wanting, and consequently fatal, or very imperfect.

If, then, the cold stage commences in disturbed capillary action, and contraction of the veins of the extremities, by which the blood is forced into the interior sinuses of the chest and abdomen, distending the spleen, oppressing the heart's action, and disturbing the circulation and functions of all the viscera, it is evident that to prevent or remove this disordered capillary action before it produces the above effects, will be to prevent or cut short the fit.

If again capillary disturbance have taken place, but blood from the extremities be prevented from reaching the interior in great excess, and from producing more than mere disturbance in the circulation and action of the vital organs, the symptoms of congestion, or the fit, will be prevented, or so far mitigated that reaction will take place with comparative ease.

Or, thirdly, congestion and oppression to the heart having taken place so severely as to prevent reaction from being evinced by shivering, the removal of some part of the blood which is producing it will enable reaction to take place, and this last is the use of bleeding in cholera, as well as in the cold stage of ague. In the cure of ague, therefore, the three intentions we have to fulfil by treatment are—

1st. To prevent disturbance of, or restore natural action to, the capillary circulation.

2nd. To prevent excessive congestion, by anticipation.

3rd. To relieve this if it have taken place.

The first has been accomplished sometimes by producing a sudden general impression on the nervous system,—as for example, by unexpectedly plunging the patient into cold water; but the more usual method is to give those medicines which possess a peculiar power in preventing periodicity, such as arsenic, and quinine, or if we consider their *modus operandi*, we might say those which possess a peculiar tonic effect upon the capillary circulation, or upon the sympathetic nerve in that part of its functions, and which, by producing an effect directly opposed to that of malarious poison, act as antidotes to it, in the same manner as diffusible stimulants will oppose the depressing effect of digitalis or aconite on the action of the heart.

The first, then, is chiefly the medicinal part of the treatment, which shall be considered hereafter; the second and third rather mechanical than medicinal, for the second intention is attempted to be fulfilled by the application of tourniquets to the limbs in such a manner as to retain as large a quantity of venous blood in the extremities as possible, but is still better effected by the early use of venesection before the more prominent evidences of congestion have been manifested. The third is, after the congestion has taken place, to draw blood rapidly from both arms, in order to relieve the congestion.

The mechanical treatment of ague by bleeding, therefore resolves itself into this, that if we can bleed after disordered action in the capillaries has commenced, and as yet has only disturbed but not oppressed the action of the heart, but before the great struggle of the system which ensues on established congestion has begun, the abstraction of blood is easy, safe, and effectual in preventing congestion and producing immediate cure; but after SHIVERING has begun bleeding is unnecessary and may be injurious, because it will then disturb the healthy reaction of which this is an indication. If practised after the commencement of shivering, the first effect of bleeding will be to bring back the congestive stage with tendency to collapse, and afterwards to relieve it; but this is done at unnecessary expense of blood, and although generally successful in cutting short the ague, is practically neither so safe nor so effectual as bleeding just before shivering begins, and therefore it is better to delay till the next antecedent period.

When, however, the evidences of extreme congestion exist without shivering, shewing that it is becoming dangerous, and that due reaction is prevented by the mechanical obstruction offered to the heart by excess of blood, bleeding from the veins cannot be had recourse to too promptly, in order to relieve it and the other organs from the pressure. But although in an early stage these are perfectly good and intelligible reasons for bleeding where congestion is severe, the practice is not to be recommended after it has existed for a long time, and the reason is this,—

Experience has proved, that often in cholera, where scarcely any external evidence is given of

reaction, or restoration to a more natural condition of the circulation, such restorative action is nevertheless really taking place, and if the powers of life can only support the oppression without utterly failing, for a certain period, the disturbed circulation of the capillaries will by and by cease, the heart be freed from obstruction and the general circulation be more or less restored. Practically, therefore, it is better and safer not to use the lancet if congestion have existed for several hours, lest by bleeding we disturb the natural tendency to recover, so far as to reach a second period of relief at least, if not of reaction; and lest instead of relieving oppression, we should thereby produce syncope. Under such circumstances it is more advisable to trust to medicine and to nature, until the 18th or 20th hour in quotidian disease, or till an hour or two before the next anticipated fit in other forms, shall afford us a safer and more advantageous opportunity of pursuing the same practice with a view to arrest the congestion in its renewed accession. The case, however, is very different when early called to a patient in whom this condition has existed but a short time, and when there is reason to believe the heart to be in full possession of its energies and only in want of mechanical relief to enable it to resume its powers. In such circumstances there is not only no danger from bleeding, but its effect is little short of miraculous, and in the course of a few minutes, the patient arises from a bed of death and torture, to the full enjoyment of life and health.

In a case like this, no mistake is so fatal as delay, which is unfortunately the most general one, for here the timid practitioner fears to bleed when he can hardly feel the pulse; he hesitates and waits until he observes it rise a little, and then acting on the rule, rather than on the reason of the practice, he opens a vein, cuts short the feeble attempt at reaction, and kills his patient in the attempt to cure him. Some have even carried culpable ignorance of the intention of bleeding in cholera so far, as failing to obtain blood from a vein, to open an artery, little thinking how much reduced is the quantity of properly arterialized blood that amid the disorder reaches the left side of the heart, and that upon the capability of that little to sustain life through the struggle depends the life itself. By taking arterial blood he takes the life of his patient, produces syncope, and having removed the feeble resistance to death which still existed, his patient sinks at once and invariably into complete collapse. Of this fact there is no want of examples on record. Be assured that the rising of the pulse after it had been lower, in cholera, as in congestive ague, is positive reason against bleeding, and the best evidence that the constitution possesses the power to carry the patient over that days' attack, to enable him to reach a second, if only let alone, and not worried to death with over-treatment.

When, however, we decline to bleed after the patient has been labouring under severe congestion for five or six hours, we must search for the practical reasons against doing so, in the effects produced by bleeding in the hot stage of intermittent. This is a subject on which I can speak from sad experience, and one on which unintentional evidence is borne by many cases

reported in various works on cholera, where bleeding has been practised in a late, but yet too early, period of the attack.

In ague, when the period of congestion is over, and the febrile stage marks the progress towards a return to natural action, but where the impression which produced the cold stage is as yet only partially recovered from, it is evident, if the theory be correct, that the effect will as readily be renewed as that of light upon the half-dazed eye, which, having been fixed on an object till insensibility is produced, and only half restored to its sensation by removal, is again subjected to the impression, without sufficient interval fully to regain its powers, it becomes almost immediately re-affected as before, and insensibility is nearly instantaneous. So it is with bleeding in the hot stage of ague; syncope and return of the congestion are the immediate consequence; or in less severe cases, or later in the hot fit, the intermittent is in danger of being converted into remittent fever of a low, irritative, and dangerous character. Much more might be urged on this subject to show that, independently of the above considerations, that period which immediately succeeds to a long and exhausting struggle of the heart and arteries is not the most favourable time to expect a greatly increased effort, but that on the contrary, *when* the tone of the exhausted vessels, now long accustomed to an over-charge of blood, has become impaired, syncope should be a more probable consequence of venesection than relief and reaction.

If then we have reason to believe that there is a natural tendency to recover from this condition, and to dread and expect its renewal at a certain future period, we must be exceedingly careful not to run into the dangers we have indicated by mistimed bleeding, but rather trust for a time to medicine alone, and await that more favourable period, which, with proper care, will arrive with certainty in by far the greater proportion of cases of congestive ague, and also, I feel assured, from my own observation, in cholera.

We shall have occasion again to return to this subject, but were I called on to give a rule for bleeding in the congestive stage, it would be to bleed early and boldly in the first, or even the second, hour, but no later, till the eighteenth or twentieth, after its first manifestation, when the same rule will again apply after the twenty-fourth.

The above remarks have been addressed chiefly to the consideration of the cold stage of intermittent fever, and their application to cholera has been only incidental; nevertheless I have stated, that I believe cholera to partake also of this character,—viz., a tendency to intermission, however slight and imperfect. I am unwilling to state a fact of this importance on my own observation only, and, prefer to rest the argument on the near relation of cholera to quotidian ague, and on its connection with diseases of an intermitting character, with which it was associated in its first onset in Persia, in 1842-3. This will form the next part of our enquiry. For the present I shall content myself with stating that the perusal of cases by a great variety of authors, has not tended to change this opinion; and

I conceive, that if read in the same spirit with which I perused them, this will also become your opinion of the disease, both as it has appeared elsewhere, and as it will probably appear here. In the usual form of cholera, I must allow that the symptoms of this condition are very slight indeed, and I cannot expect them to be conclusive with most, because only to be recognized, if recognized at all, on being sought for with the desire to find them, which undoubtedly is not good evidence. The obvious and external signs of its existence, merely amount to this,—that in most cases of cholera, not rapidly fatal, if visited about the eighteenth or twentieth hours after the commencement, the patient will be found lying in a sort of lethargic condition, apparently more sunk and more resigned than he had been for several hours before; but on examining the action of the heart with the stethoscope, you find it more natural, and less excited;—you find the warmth a little more extended on the chest, and the patient rather sulky than insensible. If, finding him in this condition, you sit down by him, and watch what takes place, you observe this apparent lethargy cease, he again becomes agitated, throws off the bed-clothes that he had latterly permitted to remain upon him, the action of the heart again becomes tumultuous, and the previous signs of suffering are increased. This certainly is but small evidence of intermission, nevertheless it is some, and considering it as such, the efficacy of bleeding in this stage of repose, or just as the agitation is beginning, has been such in my own practice, as to my mind, to corroborate the opinion; whereas the result of the practice of bleeding, as the pulse begins to rise very slightly previous to the period when this kind of repose might be expected, (as I have seen practised by others, and which you will find recorded in many published cases,) is very much the reverse. I can only endeavour to reason on this subject, which must be left to the general experience of others to decide. I am satisfied, however, that as far as my own has gone, the rule I would attempt to impress, with regard to the most favourable times for bleeding, is correct.

There are, however, other objections to this belief, as, for instance:—Why should not a man recovered from cholera be subject to continued daily accessions? This I confess myself unable to explain, but such is the case with many other diseases, such as ague cured by bleeding; and it is not always the case in cholera, though the character of the accession may differ. It would be too much to attempt to explain everything of what is confessedly so obscure, that even the smallest contribution to its history is looked for with anxiety; but while upon this subject, I may merely mention one point of observation, which, if more extended experience tend to confirm it, may aid in explaining the natural mode of cure in cholera. This is, that in all forms of quotidian ague with which I am acquainted, there appears a marked tendency to run a course of three days; and you will find many recorded cases of cholera which will bear this interpretation, where, after three accessions, or, if you please, three days' continuance, of the symptoms of cholera, the coldness and

purging cease. Thus, a man has purging one day and gets better; next day he is attacked with algide cholera, he struggles through this, and there is imperfect attempt at reaction, but the purging, cramps, and coldness again become severe on the third; if this day's accession be not fatal, he goes on into the stage of consecutive fever on the fourth day. Many cases appear to confirm this view, and many to oppose it, as may very naturally be expected, for it is by no means easy to distinguish the effects of the very active treatment pursued, from those of a very active disease.

In treating of cholera, one of the greatest difficulties arises from its unfortunate and most inappropriate name, which would seem to point to the diarrhœa and disturbance of the bowels as the essential part of the disease; and if we look merely to popular opinion, and to that countenanced by documents issued by authority, it would appear as if no room were left for doubt upon this subject, and that the great matter to be attended to in the cure, is the arrest of diarrhœa, as if that were an invariable symptom, and the most imminent source of danger. It is undoubtedly very right in popular treatises and directions, to fix public attention upon this symptom, because in the epidemics best known, this has been one of the most frequent early effects, and it is well that it should be looked upon as most dangerous, and as a good reason for applying for medical aid before worse follows; but it does not become the professors of medicine, as a science, to adopt such an opinion without examination. We have endeavoured to shew, that, according to particular circumstances, of which we are ignorant, a very considerable derangement of a part may exist without that general disturbance of the whole capillary system, which we observe in the cold stage of ague or a confirmed attack of cholera,—that exudation may at one time take place from the bowels; at another into the cellular texture of the body generally or locally; at another, that this peculiar condition may chiefly affect the cerebral system, with extremely little or no evidence of the capillary circulation of the extremities partaking of the influence,—that in fact, the force of the disease may at one time be directed on one class of organs, at another on another, just as we witness the fever of one year to be attended with ulceration of the ileum,—of another in the colon,—of another with pneumonia,—and yet, another with cerebral affection, &c. So when we come to consider the different modes in which the system may be and is affected by the impression of a choleric influence, we shall find it producing the same effect on the general capillary circulation, and the same consequent congestion of the interior organs; but we shall observe that this oppression does not always seek the same mode of relief, although the end attained is still the same—viz., diminished quantity of the venous blood; and that it does not uniformly expend its force by exudation into the intestines, which is the form we are most familiar with, but that in like manner exudation will take place into the serous tissues and from the skin. These are my reasons for not insisting so much as is usual on the diarrhœa of cholera. Even those authors who lay most stress on this symptom,

constantly inform us that the most malignant cases are those in which there is neither vomiting nor purging; such, for instance, as those extreme cases which almost always occur on the first arrival of cholera in a district, where the patient is seized with sudden pain in the epigastrium and expires in a few minutes, with the word "water" on his lips, but without either vomiting or purging,—that is to say, without the more ordinary means of relief to the congestion having come to the aid of the vital powers. Thus, Mr. Parkes, who is one of our most recent authorities in cholera, but whose views are very different from those now advocated, says,—“There is no one who has seen much of cholera who does not know that, exclusive of the mildest forms of the disease, a case with little vomiting and purging is more malignant and more rapidly fatal than one in which these are prominent symptoms;” in other words, this might be expressed, that where natural relief to the congestion does not take place, the congestion proves more fatal. Premising then, that we do not look upon purging as essential to cholera, but only as the most common mode of relief to the circulation, and that it takes place earlier or later in the stage of congestion, according to the peculiar tendency of the epidemic and condition of the individual attacked, we shall trace the ordinary course of the first stage of cholera up to this point, passing over those cases of diarrhœa in which it would appear that the relaxed condition of the enteric vessels proceeds so *pari passu* with the general tendency to congestion, as to prevent any serious amount of internal congestion from occurring, such as is very frequent in the first day's attack of cholera, and from which many recover without passing into the algide stage.

When a man is attacked with cholera there is something in his appearance which another, who has had experience, may recognize, even before the patient himself is aware of it; there is a sunken clay-coloured cast in his features; he looks stupid; perhaps has slight dimness of vision, or dulness of hearing; his hands look shrivelled, the nails blue, and the veins on the back of the hand are dark and contracted, like lines traced with ink upon the skin; it is cold and damp to the touch; if you look at the tongue you find it clean, pale, and watery, as if macerated till deprived of blood, and the conjunctiva is bloodless. He, perhaps, now feels a sudden but slight pain dart occasionally through the left breast and arm, and if you press upon the epigastrium, especially over the spleen, he complains of pain; he has then sudden call to stool, perhaps vomiting, or according to the character or type of the disease, there may be intense pain and sense of burning in the stomach, &c. Let it suffice for the present to trace the course of these symptoms up to this point.

The shrunken condition of the skin indicates the state of the peripheral capillary circulation, and when the minute vessels reject their blood, it accumulates in the vena cava, overcharges the right auricle and ventricle, and interferes with their action; it distends the spleen to its utmost capacity as the reservoir provided by nature to relieve the circulation

when oppressed by too great accumulation of venous blood. Hence pain referable to the heart, and that produced by pressure on the spleen; the pulmonary capillaries partake of the inaction, and resist the passage of blood through them, the accumulation of blood continues from the exterior, and the inferior cava is so distended that it is impossible for blood to enter it by the renal veins; the circulation of the kidneys being thus suspended, their secretion is arrested, hence suppression of urine. Still blood accumulates which cannot revert through the well-valved veins of the extremities, and it must go somewhere. The portal circulation already oppressed, so as to prevent the secretion of bile, now yields still further, and the blood is forced back in a retrograde course along the mesenteric veins till their minutest terminations on the villous coat of the intestines are injected as with a syringe, and their natural action is at an end; a little more blood suffices to make the watery particles filter through the membrane, carrying with it the mucous epithelium, which gives that peculiar character to the cholera evacuation that has been so aptly described as the rice-water purging. No sooner, however, has a large evacuation of this kind been produced, than immediate relief is, in the great majority of cases, experienced by the heart which had been struggling with the load of blood that oppressed it; the same effect is produced directly, which we endeavour to produce indirectly by opening the external veins, and the heart is thereby enabled to overcome the resistance of the capillaries, (already as I think disposed to relax,) thus a natural cure is often effected which the well-timed administration of a stimulant may hasten and confirm. If, however, this first evacuation of the fluid particles of the blood does not suffice to give relief, the same effect of increased congestion and attempted relief by purging takes place again and again, till the power of reaction ceases, and the patient dies in the stage of collapse. Perhaps, however, he is more fortunate, and though ineffectual to produce complete relief, and restore the power of the circulation, these frequent drainings of the interior veins may suffice so far to relieve him, that the congestion does not destroy life, and there may yet be sufficient blood pass through the pulmonary capillaries to maintain life through this emergency, and so far to restore more natural action, as to permit of something approaching to repose to the patient from his sufferings, and partial return of the organs to their natural functions. This would doubtless proceed gradually to reaction, and sometimes does, when there is no fresh accession of capillary disturbance to renew the congestion, and the consequence is the low form of fever alluded to; but unfortunately there appears to be a tendency to relapse, which my observation leads me to believe occurs just twenty-four hours after the first commencement of capillary disturbance, the weakened powers now more readily yield to the oppression, and about the twenty-sixth or twenty-eighth hour is one of the most frequent periods of death in those who have escaped during the first eight hours. After this the period of death must be uncertain. I find that Mr. Parkes gives the average period of death

in forty-one cases as twenty-seven and a half hours from the commencement.

Having now considered the subject of congestion at great length,—first, in its probable origin; secondly, in the effects on the peripheral circulation; thirdly, in the effects and symptoms of the distension of the thoracic and abdominal veins and viscera; and fourthly, the artificial and natural means of mechanical relief and cure, we have now, I think, only to consider the symptoms of recovery and of death in cholera, and of the *post-mortem* appearances, before we proceed to the medical part of the treatment.

The symptoms of the disease, if traced in their natural order of succession, are as follow, and those of recovery these reversed:—

1st. Constriction and bloodlessness of the capillaries—of the skin first, and afterwards of other organs, with coldness of surface.

2nd. Oppression of the heart and pain in the epigastrium.

3rd. Suppression of urine.

4th. Suppression of bile.

5th. Vomiting and purging—one or both, or neither.

6th. Muscular spasms in connection with spasmodically contracted colon, and with the state of the bowels.

7th. Especially where the purging has been absent or scanty, tetanic convulsion of the whole body, from the influence which at first was confined to the circulating system, proceeding onwards to attack the nervous system, as the circulation of arterial blood ceases.

8th. Death by mere cessation of action of the heart, &c., or by affection of the nervous system in tetanus, or both combined.

9th. Returning warmth to the skin after death, which in life had been icy cold. This, as far as my own experience goes, is always the case, commencing in the extremities, but, perhaps, does not occur so remarkably when purging has been very long continued, and the disease much prolonged. Of this I cannot speak with certainty. Partial return of warmth to an isolated part of the body is mentioned by several authors as a sign of extreme malignancy in the attack, and a certain forerunner of death. In all the cases where I have witnessed death from a rapid attack of cholera, whether in this country or in Persia, where there was either no purging, or where it had soon ceased, I observed the feet begin to get warm some minutes before death, and sometimes the warmth spread even above the knee, while the thighs and body remained cold, and the patient yet lived. This I look upon as a sign of death, beginning in the extremities, and I have invariably observed, that after the occurrence of this symptom, the least interference was apt to induce tetanic convulsion. I have twice attempted to draw blood under these circumstances, but am now convinced that this symptom always is a sign of death, whether the patient appear to live or not, and I feel much inclined to consider that hope still exists, so long as this symptom is absent. We shall again allude to the subject in speaking of the treatment by heat and cold.

Post-mortem spasms in the muscles not unfrequently

occur, even some hours after death. These do not appear to be the mere effect of relaxation of spasmodically contracted muscles, but rather resemble the jerking spasms produced by galvanism on an animal recently killed, and are probably intimately connected with the cause of warmth returning to the corpse, which in life had felt icy cold, and afford some reason to believe that the condition of the capillaries produced in life by cholera is not a mere cessation of vitality in them, as we have considered it; for the cold, where purging is scanty, exceeds that of any dead body, insomuch as to suggest a question, whether the chemical or electrical actions in the capillaries which belong to health may not be not only impaired, but actually reversed in the disease, and heat absorbed instead of being evolved.

On opening the body after death, the appearances are exactly such as we should expect from the symptoms. The right side of the heart is found gorged and dilated, the dilatation and softness of the coats being greater as the case has been more protracted. The superior and inferior cavæ, and all their larger branches are loaded with dark, tarry, half-coagulated blood. The minute vessels of the lungs are empty, and the parenchyma often shrivelled and contracted, being pale on the surface, while the pulmonary artery is quite full of blood. The left side of the heart is contracted, and either empty or contains firm coagula, indicating a greater amount of life in the arterial than venous blood, which forms no solid coagulum; and the contraction of its auricle and ventricle a less amount of exhaustion of the muscular fibre in the left than on the right side of the heart, which is flabby and distended. The amount of congestion of the portal circulation, &c., is always considerable in the large vessels, but the smaller ones are more pale and bloodless in cases in which there has been much exudation. The gall-bladder generally contains bile. The spleen is commonly congested, but sometimes found empty, which is, probably, a *post-mortem* effect of its peculiarly elastic structure; when death takes place from consecutive fever, however, it is soft and friable, an almost invariable condition in death from malarious poisoning by tropical fever, &c. The intestines present a peculiar appearance, the colon much contracted and empty, the small intestines containing fluid similar to that passed in life, mixed with a denser material, probably the fibrin and albumen in peculiar chemical combination from which the more fluid part of the blood had been drained off, the sub-mucous coat is distended in different places with the same material, sometimes mixed with broken-down red globules. The kidney is nearly normal, and the bladder contracted; the brain seldom presents anything peculiar. These appearances require no comment beyond that which has preceded their description in relation to the symptoms.

It would appear, then, that congestion and oppression to the circulation is always the cause of death, and that congestion is a consequence of disordered capillary circulation. We have sufficiently discussed the modes, both natural and artificial, of relieving this congestion, but as yet we have left the means of removing its cause

in the capillary circulation altogether unconsidered, although it is perfectly evident that this must be the main object of medical treatment. The patient is cold, nothing can be more natural than to try to warm him, and the circulation being nearly at a stand, what is more natural than to rouse it with a stimulant? But then he is cold only to our sensations, not to his own; he is burning and suffocating, and cannot bear even clothing, much less external heat; he is craving for ice and cold water, and the hot stimulant draught which we force upon him is torture; he is vomiting, yet anxious to drink.

Are we then to treat him according to our sensations or to his?—to torture him, or indulge cravings that appear to us so opposite to what his condition requires?—or are we to disregard alike his sensations and our own impressions, and seek for the means of removing the cause of this anomalous condition?

These are questions of which we shall defer the consideration till our next meeting.

CASE OF FUNGOID DISEASE OF THE PANCREAS.

By GEORGE NORMAN, Esq., F.R.C.S., Senior Surgeon to the Bath United Hospital.

(Read at the Quarterly Meeting of the Bath and Bristol Branch of the Provincial Medical and Surgical Association, September, 1848.)

A gentleman, aged 31, consulted me in the beginning of July, 1848, for an uneasy feeling after eating, and a degree of nausea, which he had experienced during the previous fortnight, having always before enjoyed good health. There was nothing to induce a belief that it was more than a temporary derangement of the stomach, but in a few days after, the tunica conjunctiva became yellow, and in less than a week he had complete jaundice. There was no enlargement or fulness about the region of the liver, nor any pain felt on pressure. An active purgative plan did not diminish the jaundice, and the evacuations exhibited a total absence of bile, and, excepting on two or three occasions, there was never afterwards any evidence of the bile getting into the alimentary canal.

On the 1st of August, I again made a careful examination of the abdomen; there was still no evidence of disease of the liver, but by pressing very hard on the region of the stomach, I could feel an oblong tumour, crossing the spine, hard, deep-seated, immovable, and not painful on pressure; its situation was that of the pancreas, but it was difficult to believe that that organ could be felt in a person not emaciated.

He was put on a course of mercury, and his bowels kept relaxed by taraxacum. During the whole of this time he never complained of pain; his appetite was good, and his nights very tolerable. The mercury was continued till the gums became tender, but without any mitigation of the jaundice, and the tumour, when again examined, was found to have increased in size. On the 13th of August, Dr. Davies saw the case with me, and in examining the abdomen, a hardness and