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ON THE CAUSE OF DEATH IN FEVER.

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The fatal termination of many cases of fever evidently depends upon structural lesions, which can be displayed by dissection. In some instances, it seems a question whether the morbid appearances discovered are sufficient to account for death; whilst, in others, the most careful and deliberate post-mortem examination gives no evidence of any decided change of structure which can be considered as the product of disease.

The following observations are intended to have reference, principally, to the last class of cases, but will to a certain extent be found applicable to the others also. The morbid appearances which occur in the exanthemata, or eruptive fevers, are usually so different, that the consideration of them will not with propriety come under the present view, which will be confined to an examination into the cause of death in continued typhous and bilious fevers.

When dissection displays no structural lesion sufficient to account for death, to what must the fatal termination be attributed? Is it owing to the lengthened continuance of the fever? Does the depraved state of the *functions*, which constitutes fever, or, at least, which accompanies this disease, tend, essentially, to such a conclusion? Are the patient's stamina broken up, and the tone of his nervous system utterly destroyed? Is he in fact worn out by fever?

If such be the case, the enquiry into the manner in which depraved functions produce that state, which terminates in death, must be one of momentous importance. And if the enquiry should lead to an examination of the altered condition of the functions during fever, and from this examination should result a conviction that the alteration which occurs in some of the most important functions of the system is to be considered more in the light of a change of function for remedial purposes than a mere disordered alteration, will not this tend towards the partial removal of that unfortunate obscurity with which the cause of death in such cases of fever is at present shrouded.

When patients suffering from fever first apply for medical treatment, it is often found that they have, for some time previously, felt ill. Ordinary exertion has been irksome; sleep either broken or unrefreshing; the mind either irritable or inclined to despondency; and the appetite unusually variable. Still, however, the regular meals have been taken, and particularly if the individual is in the middle or higher ranks of life, recourse has been had to stimulants and delicacies,

with a view of exciting and restoring the palled appetite. Indigestion may consequently have loaded the bowels with a crude and unassimilated mass, which it is beyond the power of the daily evacuations effectually to diminish. This "*rudis indigestaque moles*," may have been either partially or completely removed by active aperient medicine, but the circumstances which led to this condition being still in operation, after a time, the rigors, heat, and other unequivocal symptoms which form the combination, denominated fever, set in, and absolutely prevent the individual from proceeding longer in the course which he has lately adopted.

The vitiated condition of many of the most important functions of the system, which is always present during fever, has a most material effect in checking, and frequently in entirely preventing those processes of assimilation upon which the nutrition of the body depends. The digestive functions are impaired in a marked degree; there is no appetite, except for fluids of the mildest description, cold water being often preferred by the patient to every other kind of beverage. There is nausea, and frequently vomiting; the secretion of bile is deranged; the excretions from the skin, bowels, and kidneys, are irregular in time, in quantity, and in character; and, as might be expected, the circulatory and nervous systems are deranged in a corresponding degree. The emaciated condition of the body, and the dryness of the skin, and of the membranes of the mouth, fauces, and other internal mucous surfaces of the alimentary canal, evince the diminution of the general fluids of the system. The increased thirst appears to be the demand for a supply sufficient to remedy this deficiency; but if the fluid taken into the stomach is either rejected by vomiting, or carried off through the bowels in liquid evacuations, the end intended to be fulfilled by the increased supply of fluid, is entirely frustrated; and, if such a state be of long continuance, that exhaustion, which terminates in death, will be the result.

It has been stated that there is no appetite except for mild fluids.* If such fluids as water, barley-water, and mucilage, will alone be tolerated in the alimentary canal, and if, as is generally admitted, a large quantity of any of these contains but a trifling proportion of the materials of nutrition, it follows as a direct conclusion, that not only must a considerable quantity be taken into the canal, but it must also remain there a sufficient time to allow the now debilitated organs of assimilation to

* This remark applies more particularly to the commencement of fever. In the last, or low stage, that of exhaustion, the appetite, in many instances, inclines towards stimulating liquids.

separate from it those nutritive particles which are required for the support and maintenance of the various structures of the body. Neither must the state of the saliva, bile, gastric and pancreatic juices, and of the mucous secretions of the alimentary canal, or the urinary excretion, be overlooked, as irregularity of the functions upon which these depend, is always found, to a greater or less amount, in fever. Another reason why the process of digestion, during fever, ought to be allowed to be slowly conducted, is, that the previous state of the system has fatigued and harassed all the organs connected with digestion, and these consequently require the rest, with which digestion, equally quick with that of health, is altogether incompatible. All the natural indications in fever agree with this view. The senses desire a moderation of the intensity of their several natural stimuli. The eye will not tolerate the usual degree of light. Common sounds produce annoyance; and the taste and smell are also affected. Bodily exertion and mental application are equally irksome; and the animal seems fast verging into a vegetable state of existence.

But it is to this temporary prostration of all the powers of animal life that the safety and complete renovation of them is owing. The timely pause has not only rescued the sufferer from the grave, to which he was hastening, but has left him with renewed strength and awakened energies to fulfil to the end of his course those duties which Providence has allotted to him to perform. If this be considered as a correct account of the phenomena of fever, in their most simple form, the duty of the medical attendant is obvious. He must superintend the progress of the changes going on, with anxious scrutiny, and avoid that interference which is uncalled for by the nature of the case. The interference to which I wish most urgently to call attention, consists in the mismanagement of aperient medicines. If, at the commencement of fever, manual examination of the abdomen and the character of the alvine evacuations show that the alimentary canal is more or less loaded with undigested matter, the propriety of commencing the treatment with aperients, calculated to remove the irritating contents of the bowels, cannot be controverted. But if the evacuations present characteristics which are usually considered indicative of vitiated secretions; if, for instance, the motions seem to contain too much or too little bile, even the mild form of aperients, usually called alteratives, are apparently in many cases decidedly injurious. This will, I have no doubt, to many, appear a startling proposition. If, I may be asked, the secretions are wrong, must we not rectify them by medicine? If the evacuations consist almost entirely of bile, is the state of the liver, which this circumstance indicates, to be left to the unaided "*vis medicatrix naturæ*?" This question may be answered by another, viz., whether it is not probable that this unusual secretion of bile may be instituted for the purpose of rectifying something which was wrong in the functions of the digestive apparatus? The grounds for such a supposition are, that this abnormal secretion never occurs except after previous disturbance of the digestive organs, and that its presence is a proof that the contents of the bowels are already sufficiently irritating to their internal surface without increasing that irritation by purgatives.

During the progress of fever, the processes of

nutrition are materially affected, owing to the improper performance of the functions of the alimentary canal. Those ingesta, which in a state of health, afford the principal materials of nutriment, now appear the most irritating to various parts of this canal. Sometimes the stomach rejects everything except the most simple fluids, and this rejection is frequently accompanied with bilious vomiting. When the disposition to vomiting has ceased, or even during its continuance, the bowels become deranged, their excretions irregular and of depraved character, and there is frequently troublesome diarrhoea, flatulence, and even tympanitis. When this state of the digestive organs subsides, it must leave them in a seriously debilitated condition, nor can they be expected at once to return to the regular performance of their important functions. The same time which these functions have required for their performance during health cannot now be fixed as a rule for their completion. The ingesta must not be expected to mix with the various secretions, to traverse the length of the canal, and to undergo those processes which are necessary for separating from them and transmitting to the general system the nutritive materials, and then be expelled in the form of fæces, in the same space of time which was sufficient for these purposes during a state of health. This time must not be limited to 24 hours, nor to double or treble that time. It must not be limited by any arbitrary rule, but the unaided powers of the functions themselves must in this case be depended on, unless abdominal tumefaction, pain, or uneasiness supervene; and it will be found that the greatest advantage often accrues from the bowels remaining seven or eight days without an evacuation.

When fever has continued for a week or a fortnight, and no indication of a loaded state of the bowels is present, and particularly if the patient has suffered during the attack from diarrhoea, the torpid state of the bowels, whether produced by the exhibition of opium and astringents or otherwise, is usually considered unfavourable, and small doses of gentle aperients are prescribed. The effect of these small doses is frequently more powerful than might have been anticipated. In some instances, a tea-spoonful of castor oil, two or three grains of powdered rhubarb, of *hydrargyrum cum creta*, or of carbonate of magnesia, given, either separately or in combination, and equally small doses of sulphate of magnesia, of decoction of aloes, or of blue pill with colocynth, have, in my practice, been followed by troublesome diarrhoea.

To refer to any number of such cases would too much extend the length of this communication, but the following appears to me so applicable to the subject that I will relate it in a few words. The case was one of malignant typhus, and had continued about a week when I first saw the patient, a young woman about 25 years of age. Oct. 28, 1837, five grains of blue pill and five grains of colocynth produced free purging, with aggravation of all the symptoms. Up to Nov. 1, the only medicine she took was three grains of carbonate of magnesia four times in the day. She now took the citrate of potash every four hours. Nov. 2, diarrhoea much increased, other symptoms worse; ordered, opium half a grain, di-acetate of lead two grains. Bowels checked, and remained without action until the 5th, in consequence of which she took car-

bonate of magnesia ten grains, and sulphate of magnesia a drachm, which operated freely.

The effect of the condition of the bowels upon the general symptoms was throughout this case most decided. Whenever the bowels remained more than 24 hours quiet, the countenance, tongue, and respiration improved, there was less delirium, and that of a better character, and occasionally refreshing sleep, but each time the diarrhoea returned, the patient sunk back into a state of low muttering delirium, alternating with coma, and frequently passing the motions in bed. From subsequent observation I am induced to believe that if the preceding case had been treated without purgatives it would throughout have assumed a milder character. It may, however, be desirable to notice that many fatal cases of fever occurred at this time in the same vicinity.

Previously to the occurrence of this case I had been fully aware of the injurious effects of purgatives in those instances of fever in which ulceration of the bowels was threatened, but when no indications of such a state were present, I had, in accordance with the general practice, constantly prescribed gentle aperients or alteratives when the bowels did not act within 24 hours. During the last five years I have seen sufficient to convince me of the almost universally injurious effect of purgatives during the course of fever. Five days has been a very common period during which I have allowed the bowels to remain without acting, but in some cases the time has been extended to seven days with the greatest apparent advantage.

Although these remarks, on the condition and management of the digestive functions, during fever, will be found very generally applicable, yet exceptions are sometimes, though very rarely, met with. Fortunately, however, in such instances, the indications are too decided to cause any obscurity in the diagnosis. The cases to which I now refer, are those in which a collection of fecal matter is retained in the bowels in the course of fever. In such an instance the abdomen is tumified, but the tumefaction is very different from that which is dependent either upon flatus or effused fluid. It has a more solid and inelastic feel, and, upon pressure, communicates to the hand a sensation something similar to that caused by pressing dough placed beneath a cloth. Often in such a case aperient medicine will not act until after having been frequently repeated, and the motions, when procured, are either larger, or, if small, of considerable consistency, nor is the tumefaction of the bowels apparently reduced by several evacuations, although the general condition of the patient continues to improve with each copious consistent motion. On the contrary, in the cases which form the subject of these remarks, the bowels have a tendency to diarrhoea, or are so easily acted upon by medicine that motions of much consistence are not generally obtained, and the abdomen is not tumid; or if tumid, the nature of its contents, whether flatulent or fluid, can be easily ascertained by manual examination. Amongst a considerable number of cases, I have met with only two, in which any large accumulation of feces had collected in the bowels, and in both instances the typhoid symptoms, which were of an aggravated character, quickly improved under the use of purgatives. The

patients, who were girls about 12 years old, had not been subjected to medical treatment during the course of the attack, and both appeared in the last stage of typhus. It is, perhaps, of consequence not to overlook the particular change in the female system which often commences about this age.

If, when dangerous symptoms occur from exhaustion, during fever, it is of so much importance to allow the impaired digestive functions sufficient time to perform their duties, by avoiding, as much as is possible, the exhibition of purgatives, how much more necessary must be our adherence to such a plan of treatment when the mucous membrane of the bowels is in that diseased state which terminates in ulceration, or when ulceration has already commenced. In these cases the torpidity of the bowels becomes the safety of the patient. That ulcers of the bowels will, like other ulcers, heal when properly managed, is now an indisputable fact, and this proper management consists in placing the affected intestines as much at rest as is possible. Those who had the pleasure of hearing Dr. J. L. Bardsley's excellent paper "On Affections of the Mucous Membranes during Fever,"* will be fully prepared to agree with this view of a part of the subject to which I can, at present, only incidentally allude.

In the fevers which follow severe injuries; in those which succeed to accidental, idiopathic, or uterine hæmorrhage, the same treatment appears to me applicable.

The injurious effects of purgatives after hæmorrhage I have endeavoured to point out in a communication to the Manchester Medical Society, "On the Treatment of Hæmorrhage by Opium."

The peculiar description of fever often occurring after parturition, induced either by the difficulty of the process, or by other circumstances, as well as that which is known by the name of puerperal fever, are instances apparently requiring similar caution in the use of aperients.

The fever which supervenes upon some other severe disease will come under the same view. Cholera may be mentioned as an instance. Many patients passed through those symptoms, considered indicative of cholera, and sunk some days, or, even weeks afterwards, from fever.

I merely cursorily allude to these circumstances, to attract attention to the probable extensive application of the principles I have advocated in the present short communication in which I have attempted to condense such a notice of the subject as might induce some of the members of the Association to give a fair consideration to the method of treatment described.

I have endeavoured to show in the foregoing observations—

1st. That the alteration which occurs in some of the most important functions of the system, during fever, is to be considered as remedial.

2ndly. That a torpid state of the bowels, in the low stage of fever, is the effect of some of these remedial alterations of functions.

And 3rdly. That aperient medicines are generally

* Read before the Manchester Medical Society, Nov. 7, 1840.

contra-indicated, in consequence of the exhaustion they are calculated to induce in the peculiar condition of the digestive and assimilative organs which exists during fever.

ON THE DIAGNOSIS OF INCIPIENT TUBERCULIZATION OF THE LUNGS.

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The annals of medicine supply us with a few cases in which phthisis pulmonalis, in its advanced stages, has yielded to remedial measures, and morbid anatomy still more frequently reveals appearances which are attributed to the presence and subsequent cure of tubercular deposit; few, nevertheless, will be disposed to question the assertion that these instances of the fortunate termination of the disease are so rare, as in no wise to affect the ancient and general conviction of its incurability when once fairly established. How imperative, therefore, does it become upon all who are anxious to aid in the endeavour to arrest the progress of a malady which forms so important an element in the mortality of this country, to study with increasing earnestness that period of its existence in which its germs are first deposited. For the detection of this phasis of the disease, it is useless to place any dependence upon the evidence afforded by the outward symptoms; we must even throw aside those grosser notions of auscultation which familiarity with the ordinary, and more evident physical signs of disease, is apt to engender. We must not be content to be stethoscopists, but must become *auscultators* in the true sense of the word; we must *listen with the mind* if we would appreciate the delicate and sometimes evanescent characters of the sounds by which we may hope to certify the commencement of pulmonary tuberculization. It is not to be disguised that a competent perception of the minute shades of difference in the respiratory sounds, upon which the physical diagnosis of incipient phthisis is founded, is a matter of difficulty, even under the most favourable circumstances. Many will fail altogether in acquiring the necessary auscultatory tact, for that which is called in music a *fine ear*, or, in other words, the faculty of discriminating between delicate gradations of *intonation*, is not conferred on all alike. Much of the difficulty, however, may be removed by a closer attention to the phenomena of healthy respiration than is usually accorded to them, more especially in reference to the existence of a *duplex murmur*, since the earliest evidences of the presence of tubercular deposit are derived from certain minute alterations in one or both parts of the respiratory act.

Tubercular disease of the lungs first appears under the form of small rounded masses, dispersed through the upper lobes, the circumjacent tissue in general remaining perfectly healthy. This deposit may consist solely of the miliary granulations described by Laennec, or, as is more commonly the case, a few crude tubercles, as they are called, are intermingled. The progress of the disease induces a more abundant deposit; the previously existing granulations, at the same time, becoming of a yellow colour, until the

upper portion of one or both lungs is crowded with tubercular masses of a cheesy consistence, and which exhibit a tendency to undergo the process of softening. This series of change constitutes the incipient stage of the disease, the diagnosis of which is the subject of the present paper. It may be mentioned that, towards the close of this stage, the bronchial tubes put on the appearances of irritation, and the surface of the lung is frequently occupied at intervals by emphysematous air-cells.

The symptom which, in the majority of instances, is first produced by this condition of the organ, is cough; at first, occasional and dry, afterwards, more frequent, and accompanied by expectoration. With the cough, and sometimes preceding it, the breathing is noticed to be slightly accelerated, especially on exertion. Pains are also occasionally felt at the summit of the sternum, or between the scapulæ. The first stage of phthisis is also occasionally ushered in under the mask of acute bronchitis, or is first announced by the occurrence of hæmoptysis. In the former case, the symptoms succeed each other with great rapidity, whence the disease has been termed acute phthisis; in the latter, hæmoptysis, either slight or copious, precedes both the cough and dyspnoea.

Such are the symptoms of the first period of a disease which, if not at this time recognised, almost inevitably tends to a fatal termination. We will now enquire into the diagnostic value of each, and first of cough.

Cough is a symptom depending upon irritation of the mucous membrane of the bronchial tubes, and air cells, and may be caused by many different deranged conditions both of function and organism. As a symptom, therefore, of phthisis, its diagnostic value is very little. The points which are to be noticed as appertaining to the tubercular cough are these:—It comes on frequently without evident cause; one or more months may elapse without expectoration; and it is usually at first troublesome only in the morning. The coughs which are likely to be confounded with it are that produced by simple bronchitis, and those which depend upon sympathetic disturbance. The catarrhal cough is thus distinguished, it can usually be traced to some evident cause, as exposure to damp and cold, and it is more quickly accompanied by expectoration, which in a few days becomes mucopurulent.

Among the sympathetic coughs which may be confounded with the phthisical, may be mentioned that which depends upon gastric irritation, reflected upon the pulmonary plexus of nerves. This species of cough is, however, louder, and more harsh than that of consumption; it comes on in paroxysms, and frequently causes vomiting by its violence. There is in general no expectoration, or the sputa, if there be any, consist of the secretions of the fauces.

The nervous cough of hysteria, prior to the introduction of auscultation, was a fruitful source of alarm; in the present day it can scarcely be confounded with that depending upon disease of the lungs.

Expectoration.—The expectoration of the earliest period of phthisis affords no information. Prior to the softening of the tubercles, when the tubercular materies may be seen in the sputa, the expectoration consists solely of the mucous secretion of the tubes and air-cells, and therefore in no way differs from that