lowing closely on some disease with which it can be clearly connected, commence another careful examination of the patient. Is there cough? Can any heat or tenderness be detected about the larynx or trachea? Follow with your ear the course of trachea. Is there every-where the same uniform rushing noise, or on some particular spot can you detect a more forcible rushing, a whizzing or whistling, or a rattling and guggling? Is that whizzing or rattling either confined to one spot, or less sonorous as you recede from that spot above or below, or is it diffused over a considerable portion of the trachea?

You would, I think, bleed, purge, and most certainly blister. Your ear will guide you to the part to which the blister should be applied. The physis having set, you would commence a course of fever medicines; you would consider it as a case of chronic inflammation, and to be subdued, not by excessive depletion, but by the continuance of moderate depletory measures. You would probably bleed again in less quantity; give a second dose of physis, and most certainly blister again, or keep the blister discharging by some stimulating unguent. The degree of success which attends these measures would guide you in pursuing them further. If no relief is obtained after a fortnight or three weeks, you would ponder on another mode of treatment. You would again carefully explore the whole extent of the trachea, and if you could yet refer the rattle or whizzing to the same point, you would boldly propose *tracheotomy* in despite of the sneer of the talented author of "The Elementary Lectures," for you would certainly cut upon the seat of disease.

If you found one of these organised bands, the removal of it would afford immediate relief; and if you found merely a thickened membrane, no harm would be done; or the loss of blood might abate the local inflammation. You will recollect what was said in a former lecture of the manner in which the operation of tracheotomy should be performed. You should not perfectly cut through a single ring, much less two or three; if you do, the arch of the trachea will be destroyed—it will there assume a sharper, roof-like shape; the caliber of the tube will be materially lessened there, and if you should perchance remove one cause of roaring, you will assuredly produce another, and that a remediless one. Once more look at these tracheæ on which the operation has been performed, and see the altered shape of the tube, and the certain production of roaring. If a portion only of two of the rings is excised, the remaining part of each will be sufficiently strong to retain the perfect arch-form of the

trachea, and without impairment of the caliber.

Of the manner of introducing a tube into the trachea, in case of much obstruction, I have already spoken. On the whole you will not eagerly undertake a case of roaring, but having undertaken it, you will give the measures that you may adopt a fair trial, remembering that, in every chronic case like this, the only hope of success depends on your perseverance.

ON THE
PATHOLOGY AND TREATMENT
OF THE
MALIGNANT CHOLERA.

By JOSEPH AYRE, M.D. &c. &c.

THE importance of the subject upon which I am about to write must be my apology for the length to which my remarks will extend. The subject I am about to consider is the pathology and treatment of the English cholera, as known and met with in this country, intending to show that such a resemblance subsists between the English and Asiatic form of the disease, as is sufficient, for all practical purposes, to prove an identity in their pathological conditions, and in the treatment required for them.

The notion entertained by many concerning the nature of the cholera morbus of European countries is, that it essentially consists in a morbidly-increased secretion of bile, which is more or less vitiated, and which serves as the direct cause of all the vomiting and purging present in the complaint; that the sudden and sometimes formidable failure of the vital powers attendant on the severer forms of the disorder, is solely the result of an exhaustion induced by the vomiting and purging, and by the abduction from the body of copious secretions, united with the irritations which those secretions produce on the first passages. That this, however, is not a correct notion of the nature of the cholera of this country, may be affirmed from the fact that the vomiting and purging belonging to it, may exist for many hours before the appearance of bile in the discharges, and of course before there is a copious secretion of it to cause them; for it would inevitably be discharged if secreted. In the same way the sunken and exhausted state is met with simultaneously with the first occurrence of the vomiting, and often before any purging is commenced. It is also well known that the most copious vomitings occur from sea sickness, and the most profuse dejection of bile and of watery secretions from the bowels, under the use of calomel and

drastic purgatives, and which often exceed very greatly what are met with in cholera, and yet without any appreciable diminution of the strength, or signs of exhaustion. The prostration, in fact, of cholera comes on in many cases very suddenly, and consentaneously with the vomiting, and often before the purging; and in the same manner it passes away or greatly lessens upon the discharges becoming coloured with the bile. It may be also stated that there is no correspondence in degree in the intensity of the vomiting between the cases of a mild kind and those of severer forms of it in which there is the most alarming failure of the vital powers. We must therefore look to some other cause for the sudden diminution of vital power met with in this complaint, and this cause I now proceed to show, is to be sought for in the peculiar condition of the liver, and not in an increased secretion of its bile, but in a partial and sometimes in a total suppression of it.

Now the circumstances under which the liver is placed are, it is well known, of a peculiar kind, for the venous blood returning from the abdominal viscera to the heart, is appointed in its passage thither to circulate first through the secretory vessels of the liver, as the *pabulum* of the biliary secretion. A portion of the venous blood, and probably some noxious principles of it, are designed to be separated from the mass in the form of bile by vessels destined for that purpose. Any interruption to the due performance of this function will necessarily occasion an accumulation of blood in the *vena portarum* and its branches, and an impeded circulation of the venous blood through the liver will follow, producing a congestive state of its venous system; and that congestion will follow, in cases where secretion is checked or interrupted, we have the amplest reason from analogy to conclude. The female breast, for instance, falls readily into a state of congestion upon any interruption occurring suddenly in its secretory functions, though the congestion in this case is primarily arterial, and the effect inflammation, whilst in the instance of the liver, the congestion consequent upon its interrupted secretion is necessarily venous, and the immediate effect an increased disorder in its secretory system; and where the suppression of the secretion is complete and sudden, a similar congestive state will follow of those abdominal organs whose venous system is associated with the venous circulation of the liver.

Now the congestion thus produced in the portal circle of the liver, constitutes the first stage of the cholera morbus of this country, and forms the essence of it in all; and though with us the congestion is usually slight, because the interruption given to the

action of the liver is partial and temporary yet it forms in every case that state of the disorder in which there is the most danger, giving rise in its severest form, as met with here, to a considerable disturbance of the nervous system, the pulse becoming small and compressible, and often intermitting; vomiting, and sometimes purging; urine scanty and high-coloured; oppression about the chest; the extremities cold and sometimes livid, and occasionally affected with cramps; the countenance sunk, with sometimes a blueness about the mouth, particularly in children, with a general depression of vital power, which may be appropriately termed a state of collapse. In its most intense form, and when occurring under circumstances of the system favourable for its influence, the vital powers may become so overwhelmed as to perish in the struggle.

In the ordinary cases of an interruption in the secretory action of an organ there is a provision made by nature for its relief. The congestive and inflamed state of the female breast, to which a sudden interruption in its secretory action gives rise, if not removed artificially by the local abstraction of blood, or by other means, or naturally by a renewal of its proper secretion, terminates in suppuration, by which the congestive state of its arterial circle of vessels is removed, a termination is put for a time to its secretory function, which is from its nature only temporary, and a healthy state of the organ is at length induced. But suppuration is the result alone of arterial action, and cannot be produced by the vessels of the *vena portarum*, whose character and structure are venous, and which, as far as our observation extends, are incapable of taking on an inflammatory action. But a permanent interruption to the secretion of the bile, and the consequent congested state of its secretory vessels, are conditions incompatible with life. Relief to this state is therefore necessary to preserve it, and there are two principal modes, by one or the other of which more or less of relief is afforded. The first in importance and value is a sudden reaction taking place in the secretory vessels of the liver, to which the spontaneous vomiting of the complaint frequently contributes, and by which a copious secretion of bile is produced. This is the natural remedy of the complaint, although often erroneously regarded as the complaint itself, because the overflowing bile by accidentally rising into the stomach, prolongs for a time that irritable condition of it, which the previous congestion of the liver had induced. Where this reaction of the secretory vessels of the liver does not come on, the second mode may ensue, which is of less efficacy, and which consists in a reaction in the arterial circle of the liver, to which the conges-

tion of the veins affords an indirect stimulus, and an inflammatory or excited state becomes established, forming in this, as in other cases of venous congestion, a partial but morbid remedy. This inflammatory state set up in the vessels of the liver, and sometimes in those of the other abdominal viscera, gives rise to an excited state of the heart and arteries, and which is known by the name of bilious fever, being distinguished by a continued interruption in the secretory action of the liver, with an abatement of those symptoms which pertain to the stage of congestion or collapse.

We have thus far confined our views to the pathology of cholera as limited to the complaint known by this name, but the term of cholera so restricted is too limited in its application. We have just noticed that the disorder is not ended upon the termination of the vomiting and purging, and the other symptoms of collapse, but that when a reaction does not take place in the secretory vessels of the liver, and which is its most usual termination, that an inflammatory action comes on in the arterial circle of that organ, giving rise to the fever denominated bilious. As the cholera morbus, therefore, may thus exist after the supposed pathognomonic signs have disappeared, so it will be found to be present in numerous cases before the more obvious and recognised signs of it have come on. There is in fact a chronic form of the complaint which may precede for several days and even weeks the more active stage of it or in that of cholera proper, and either terminate suddenly in a reaction of the secretory vessels, or pass into the inflammatory stage, without the supervention of the active state of it. This, the chronic, varies in its degrees of force, as the degrees of venous congestion vary. It is often accompanied by a diarrhoea, and with nausea and rejection of the food, oppression or faintness about the stomach, at first a craving, and afterwards an utter extinction of the appetite; drowsiness succeeded by great watchfulness; startling dreams; habitual coldness of the feet, and sometimes cramp of them; restlessness of mind; paucity of urine, with sometimes hepatic, uterine, or hemorrhoidal hæmorrhage; the alvine discharges being essentially morbid, and of the colour of grey paper, verging towards that of yeast, and occasionally of the colour and consistence of tar. It is a complaint of common occurrence, and affecting persons of every age, though most prevalent with children. In essence it is the same as the cholera so named, differing from it only in the more gradual approach of the congestive state of the liver, and in the more frequent supervention of the inflammatory stage, when it assumes the name of bilious fever, as it is

met with in adults, and that of infantile remittent or marasmus in children.

Before proceeding from the consideration of this part of our subject to that of the treatment, it will be proper, for the elucidation of both, to make a remark or two upon the modes by which it may be assumed as probable that the disturbance in the secretions on the liver is produced. That the disorder originates from some disturbance in the digestive function, is fully and amply established. The process of digestion is carried on by a series of actions of organs, which act in accordance together for that object; and by a union of sympathy established amongst them, there is a befitting adjustment of the quantity of the secretions required from each, as well as of the periods when they should be poured forth. Thus the food, when received into the mouth, excites there, by its own peculiar stimulus, the action of the salivary glands, and when it reaches the stomach there is a corresponding effect excited there to procure from it its necessary secretions; but as the liver, whose secretion is required for digestion, lies out of the reach of any direct stimulus from the food, it can only be affected by an indirect impulse communicated to it from the stomach. In the healthy condition of the stomach, and under the use of proper food, the stimulus imparted to it by the digesting or digested aliment will be of a healthy quality, and a healthy stimulus will be thence communicated to the liver, and a secretion of bile afforded suitable alike in its quantity and kind. If, however, on the other hand, a contrary condition of the stomach exist, the stimulus communicated to the liver will be insufficient in degree, or of a morbid nature, and an insufficient secretion of bile will be supplied. It would be foreign to my design to enter upon the consideration of the nature of the particular disordered states of the stomach which give rise to a disorder in the functions of the liver; or in what they differ from mere *dyspepsia*, or some other affections of it, in which no such effect is produced, nor whether the stomach be constantly, or only occasionally, the first in the series of organs to be affected. For, upon whatever hypothesis we may found our explanation of the origin of the cholera morbus, or of the nature of those morbid states of the stomach and bowels which lead to and accompany it, or of the precise modes of action of those remote causes which are found to act successively in increasing or continuing it, the fact remains, to my judgment, indubitable, that the seat of the disorder is in the liver, and that the means suited to the relief of the disordered actions of this organ, are adequate to restore

the other disturbed functions to their healthy condition.

Having now given very summarily the views I entertain of the pathology of cholera, and of the varieties into which it is divisible, I shall next proceed to detail very briefly the circumstances which are to be considered in the treatment.

(To be concluded.)

ESSAYS

ON

ANIMAL ACTION.

By WILLIAM DOBSON, Esq., Surgeon.

NO. II.

ORDINARY muscular contraction results from the stimulus of "volition;" but this is a vague term. According to the common acceptation, it signifies the instrument which mind uses to produce certain acts. Thus, if I move my hands, the muscles are the mechanical agents, the stimulus of volition on the muscles precedes this action, and mind, the dictation, is antecedent to volition. The mind directs then, that a muscle shall move, but if the mind be confined to the skull, what is the nature of its messenger? Is it according to the electrochemical physiologists' galvanic fluid? or is it the mind which leaves the cerebri tabernaculum and carries its own mandate; this being termed volition? If so, then volition may be denominated a messenger of the mind, and that agent which induces voluntary movements. Of what is its essence we know not; we merely recognise its existence by its effects; it is a something which excites the muscles to contraction, and thus locomotion is performed. How is it then that the acephalic infant can move its muscles? It does so, and must there not be a cause? and is this volition? For volition is said to reside in the brain, yet here no brain exists; then the inference we are warranted in deducing is, that in ordinary cases, volition being a mandate of the mind, steers the movements of the voluntary muscles; but that when there is no brain, volition can not exist; hence those movements which occur in acephalic infants are caused by some other and unknown principle, which must have its seat in the spinal marrow and the nerves, this force being capable of enduring muscular movements, but in no definite manner (only mechanically), in consequence of the want of brain. What are we to designate this motor force? May we term it *nervous* volition in contradistinction to *cerebral* volition?

That there is such a difference as to admit of a distinction is clear, but we really perceive them so analogous as to almost induce the belief that they are only grades of one existence. Does the cause of locomotion exist in the brain, in the spinal marrow and their motor nerves? Is it a diffuent principle occupying the whole of these structures? And is it so ordained that each nervous fibre can cause an action in the muscular fibril it supplies? And does the spinal marrow contain an augmented quantity of this motive force, so as to be enabled to induce, through the medium of the intervening nerves, a contraction in one or any certain muscles more perfectly than when only nerves exist, these actions being independent of cerebral influence? Numerous recorded facts and every-day observations support a reply in the affirmative. And the quantity of this principle is even in proportion to the complexity of the apparatus in which it exists in a healthy state. This we shall endeavour to prove hereafter.

The 1st proposition which I have to adduce is, that the nervous system is not a unit, but that it is composed of a multiplicity of parts. 2nd. That each individual part possesses a peculiarity of organisation; and, 3rd. That each variety of structure develops a differency of function.

Similarity of structure implies similarity of function. Dissimilarity of structure equally implies diversity of function. Complexity of structure indicates numerous phenomena. Simplicity of structure is ever conjoined with simplicity of phenomena. The brain is a complex organ, and its phenomena are numerous. The spinal marrow is less complex, and its phenomena are in a ratio. The nerves are still less complex, and their phenomena correspond. These are axioms which every observation corroborates, and which sophistry can neither overturn nor invalidate.

To delineate adequately the nature of animal action, would require an extended exposition of all the metaphysical reasoning which is promulgated. But my limits will not allow, nor does the subject demand, so diffuse an investigation. We have to ascertain, as far as reasoning can extend, What are the essential changes in an animal which precede muscular motion? Is that cause which induces muscular motion, necessarily an attribute of mind? Or is it a principle *sui generis*? A principle developed by the spinal marrow and the nerves only, and not resident in the brain, but capable of being influenced by the dictates of that organ?

Let us answer these queries *seriatim*. Were muscular contraction a mechanical operation, we should look for a mechanical cause; but as it is not,—as it arises not