of any other morbid action, could be anywhere discovered. I do not pretend to assert that, in cases like the present, morbid appearances do not exist, but I am sure (and I write from a rather extensive experience) that in many instances it is very difficult to find them; and it is perhaps reserved for another age, and for more accurate and refined methods of investigation, to determine the nature of those subtle changes in the structure of the human brain, which derange the operations of the intellect, and temporarily or permanently deprive man of the godlike faculty of reason.

8, Torrington Square, August 1851.

OBSERVATIONS ON THE PATHOLOGY AND TREATMENT OF PAIN, ESPECIALLY IN FIBROUS AND FIBRO-SEROUS TEXTURES.

By JAMES KILGOUR, M.D.

THE three following cases may prove interesting, from the analogy which existed between certain of the symptoms common to each; and more particularly from the circumstance, that pain was a prominent feature in all of them. They are arranged in chronological order.

CASE I. Charles George, a young man, aged 26, tall, and rather muscular in form, whose occupation was that of a farm-labourer, was first seen by me on the 17th January, 1849. At that time he presented the appearance of a person labouring under organic disease; his aspect was sallow, his figure bowed, his walk feeble, and the least exertion produced breathlessness and exhaustion. He stated that he had been ill since the preceding June; that his medical attendant had treated him for fever; and that, for a short time, his urine had been bloody. These were the only antecedent facts, connected with the history of the case, which I could rely upon as authentic.

He then complained of severe palpitation and breathlessness upon exertion, or upon attempting to lie down; taking food also aggravated these feelings, and caused a sense of fulness and distension. His pulse beat, upon the average, 115 in the minute; it was not irregular in any way, but extremely excitable. There was no heat of skin; but the urine was reported to be occasionally turbid; there was some thirst, and the tongue was white and slightly furred; the bowels were rather confined. There was no swelling of the extremities, nor œdema anywhere. A very careful examination of the chest, which was well shaped, revealed nothing unusual, except that the situation of the apex of the heart was rather more to the right than common. Pressure at the epigastrium caused uneasiness, but not pain at this time.

The treatment was generally calmative, and at the same time directed towards the relief of the dyspeptic symptoms. During its continuance, he passed a large round worm, and gradually improved so far as to be capable of some exertion, and of lying down in bed. He was discharged on the 19th of February, with a hope upon my part, and a belief upon his own, that he was upon the highway to recovery. These expectations were not destined, however, to be at once realised.

During the summer, his symptoms returned; and he again applied to me, on the 2nd August, in a worse condition than I had yet seen him. All his former ailments had returned upon him with increased force; and, in addition to them, he now complained of a fixed pain, felt most under the margin of the left ribs, and towards the back, ascending the spine; also of an occasional pain of a stabbing character, which seemed to pass from the situation of the apex of the heart towards the spine, and produced much distress and alarm. There was great tenderness upon pressure at the epigastrium, extending upwards, and towards the left; there was also considerable epigastric pulsation, but no great tenseness of the recti muscles. The pulse, as before, was regular; but the heart's apex beat still more to the right than formerly, and could now be felt most distinctly nearly midway between the nipple and the left edge of the sternum, and upon the lower, instead of the upper, border of the sixth rib. The cause of this displacement was mysterious, not being affirmed by any physical sign, though repeated examinations were carefully made, with a view to its discovery. The patient also complained of being occasionally "caught" (as he expressed it) on the left side of his neck, so as to be unable to move it while the spasm lasted. Digestion was painfully performed, with much tympanitic distension of the stomach and acid eructation, and a pinching pain in the abdomen was sometimes experienced. The urine was at this time examined, and found of sp. gr. 1.009, colour pale, odour fetid, and reaction alkaline.

Leeching and other modes of medication were attempted, but without relief; and, after a short trial of these remedies, despairing of any advantage from medical advice, the patient gave himself over, on the 20th August, to the care of nature, and, as it turned out, his *vis medicatrix* proved sufficient for the emergency. About two months subsequent to this date, I was much surprised to meet the patient in the street, walking nearly erect, and wonderfully improved in appearance. He informed me that, shortly after he had left my care, he was alarmed by coughing up a quantity of yellow matter tinged with blood. This produced, for the moment, alarming faintness, but was at the same time accompanied by great relief to the pain and palpitation. He also said that, every day since then, he had been in the habit of coughing up a certain portion of the same matter, but that latterly it had diminished in quantity, and had become thinner and nearly colourless. I requested him to call upon me, with a view to the examination of his chest, but he did not comply with my wishes.

REMARKS. In the matter coughed up, we have the elucidation of a case which lasted for fourteen months, and baffled the penetration and perseverance of many medical observers. An internal inflammation, whose activity had many varying degrees of intensity at different times, and which ultimately terminated in abscess, had given rise to a majority of the various symptoms which had distressed the patient, and puzzled the physician.

It only now remains to discuss the probable situation of the tumour. In doing so, a reference must be made to the symptoms, both individually and collectively. The symptom which, by itself, is perhaps of the most importance to our present object, is the altered position of the heart; a change, which, in the circumstances, must have occurred

from mechanical causes, and which affords proof positive that a part, at least, of the disease lay within the thorax. Next, we have the pain, the most prominent feature of the malady, and which, from its seat and course, must have resided chiefly in the vagus and phrenic nerves, and also, by implication, in the accessory, as was proved by the spasm of the left sterno-mastoid muscle. Then we have the palpitation and breathlessness; the latter of which symptoms was probably caused by the disordered function of the vagus; while the former was most likely due in part to the mechanical violence done to the heart, as well as to its direct participation in the inflammatory process through the pericardium. Last, among the more important signs, we have the tympanitic distension of the stomach, and the excess of acid generated there; both being conditions which are often induced by pressure, though they may certainly arise from other causes. The abscess must have occupied a position partly, if not wholly, within the thorax; and there is a probability, from the existence of the last-mentioned symptom, that it exercised some degree of pressure upon the stomach. We may therefore conclude, with some confidence, that the septum between the thorax and abdomen was probably the seat of this inflammation and abscess; and we are rather led to this conjecture, from the knowledge that certain parts of the diaphragm are liable to such accidents, though the pus more generally seeks an outlet at the epigastrium or umbilicus, than upwards into the cavity of the chest. Anatomical reasons also favour this view, which explains at once the affection of the heart, the stomach, and the lungs, all of which were more involved by sympathy than by direct participation in the morbid process. Should we speculate upon the cause of the primary inflammation, it would be proper to recal the incident of the passage of the worm and the bloody urine, and to mention that two or three instances are on record, of worms having made their way outwards through some of the hollow viscera, and of having excited inflammation and suppuration in their progress. Without denying the possibility of such an origin for the case in point, I am rather disinclined to allow the claims of the worm, which should otherwise have appeared in person to support them. As regards the alkalinity of the urine mentioned above, it is perhaps worthy of mention, that Dr. Beneke, of the German Hospital at Dalston, has found the urine to contain an undue proportion of phosphates in many cases of emaciation, and when pus has been formed after acute inflammation.

CASE II. Jane Bufton, a widow, aged 58, was seen for the first time on the 16th January, 1850. At this period, she had been ill for four months, and had been treated for fever, upon a strict antiphlogistic plan. In person she was stout and well formed, but her countenance was sallow, and expressive of anxiety, and she stooped forward, not from weakness, but with a view to relief from pain. She stated that her complaint had begun with cough and spitting; and that at first she had little pain, which then bore the character of a stitch, and was principally confined to the left side. Subsequently, however, it became altered in situation, and took the nature of a dead aching, and finally of a tearing pain, occurring in paroxysms, which prevented her from lying down in bed. This was pretty much the state of matters

when I saw her. She represented the pain at that time as agonising, and as totally preventing continued sleep; it extended from the apex of the heart backwards to the spine, and upwards to the neck, also along the left arm, and occasionally invaded the lower extremity of the same side. A paroxysm was easily induced by cold air, mental emotion, or any cause of sudden hurry to the circulation. The pulse was full and regular, and beat 72 in the minute; palpitation was not complained of; nor was pain excited by pressure at the epigastrium. There was some cough, accompanied by a tough mucous expectoration. The appetite was indifferent, the bowels regular, and the tongue white. A careful examination of the chest, by percussion and auscultation, discovered nothing but an apparently sound condition of the heart, lungs, and their investing membranes. A great amelioration was temporarily effected in this case by the use of iron, in combination with narcotics and antispasmodics. But this improvement seemed to be only the prelude to an attack of greater severity, which occurred in the beginning of April, during the course of which the pulse rose to 90; there was pain upon pressure at the epigastrium; and there was also difficulty and pain in deglutition. A large number of leeches were applied over the cardiac region with very great relief; and, in the report of the 18th April, upon which day I ceased my attendance, it is stated that she was not free from pain, particularly at night, but could lie down; that she slept pretty well; and that her general condition was much improved. As I have not been applied to since that date, it is probable that this patient has continued pretty well up to this time.

REMARKS. In this case, from the nature of the early treatment, we may presume the pain to have been of an inflammatory kind at first, as it certainly was during the last attack. But, during its middle period, this did not seem to be the case, whether we look at the symptoms or at the result of treatment. Upon what, then, did the pain depend at that time? Are we to suppose that the impression made on the nerves of the affected part, during the first inflammation, had so altered their structure, or impaired their function, as to render them incapable of conveying healthy sensations, as is sometimes the case after injuries from external violence, when the parts have apparently returned to their normal condition, but when pain is still felt in their nerves? or are we to fancy that a smouldering inflammation lurked in some of the tissues, and supplied the source of irritation? Either opinion might be maintained by argument, and would certainly afford the ground for an interesting inquiry; which, however, I must decline at present, reserving a few remarks upon pain for the end of this paper.

CASE III. Elizabeth Black, aged 48, was seen on the 17th July, 1850. She stated that she had been ill for four months. In person she was above the middle height, spare, but well formed; her complexion was sallow, and the expression of her countenance was anxious. She complained of a fixed pain of great severity, passing from the apex of the heart backwards to the spine and between the shoulders, the same being aggravated by a long breath, or by taking food into the stomach. Exertion produced breathlessness and palpitation, and there was slight cough. The pulse was 84, full and rather hard, but quite regular.

Upon examining the chest, the ribs in front of the heart were found to project a little, and the left ventricle to be somewhat hypertrophied; in other respects, the heart was normal. The lungs and pleura gave no evidence of being otherwise than natural, except at a point below the heart's apex, and a little to its left, where some resonance of voice was heard, with sibilant and creaking rhonchi at the end of expiration. Percussion, however, failed to elicit any appreciable dulness at this spot. Venesection to twelve ounces was performed with remarkable relief to the pain, which from this time occupied no prominent place among the symptoms, and was only complained of when a deep inspiration was made. A slight cough, with mucous expectoration, remained, but the resonance entirely disappeared, and the râles, which were very circumscribed, became moist instead of dry. The treatment lasted from the 17th to the 26th January, when the patient was discharged.

GENERAL OBSERVATIONS. The cases which I have just described, or cases analogous to them in respect of their principal symptoms, might easily have been multiplied, had it been necessary to adduce additional testimony, to prove that the seat of pain complained of in these instances is a very common one. Abernethy used to demonstrate to his dyspeptic patients, in a manner not less unpleasant than convincing, that they could not bear pressure at the epigastrium; for the frequency of pain or tenderness in this situation had not escaped the notice of that acute and experienced observer. The fact that pain does occur here so frequently, is perhaps not to be wondered at, when we reflect that, wherever the terminal distribution of nerves occurs, there we find great sensibility. This has been remarked by M. Valleix, in his treatise upon neuralgic affections; and seems to be an arrangement by which an alarm of danger may be at once communicated to the system, and the more important organs protected from its action. But nature in this, as in all her plans, has aimed rather at the accomplishment of one paramount object, than at complete perfection in all; and we can therefore easily see, that in sensibility we possess a guardian of such vigilant excitability, that, once aroused, it is often difficult, and in some cases impossible, to stifle its warning voice. It is noticeable, that in the first of the three cases recorded, the pain was certainly, and in the other two presumably, of inflammatory origin; and that the tissue principally affected was the same in each—the fibrous. Upon these points some speculative remarks may be hazarded: first, as to the modes in which nerves are primarily affected with pain; and secondly, as to the coincidence of some painful affections occurring in connexion with fibrous tissue.

Modes in which the Nerves are primarily affected with Pain. From this inquiry must be excluded the cases of pain arising from external injury, or from reflex action; because it would be premature, with our present knowledge of the action of the nerves, to attempt any explanation of their altered function during the occurrence of pain. We must therefore limit the field of our conjecture; and, with a view to practical ends, inquire how healthy nerves may take on abnormal action. For one class of cases it may suffice to say, in the mean time, that the nerves supplying tissues, in which an unhealthy process is

going on, become involved in that action; and we are prepared to expect that, in such circumstances, some change of function may occur. But, in some instances, nerves become painfully affected by certain influences not inducing appreciable structural change; and the question is, whether in these cases such influences act for the first time otherwise than in the way of inducing inflammation. By way of example, moisture and cold produce tic; but is not the first attack of that complaint always of an inflammatory nature, when the nerve was healthy prior to its exposure to the exciting cause? Again, a *materies morbi* in the blood may stand in the place of cold and moisture; and what is the result? An attack of acute rheumatism in the first instance; and, most likely, a succession of chronic attacks for the future. If this reasoning be correct, it follows that healthy structures are incapable of morbid action, which is not the general belief as to nerves. A practical deduction would also follow, that the treatment in such cases should be, to use an old-fashioned term, antiphlogistic. Pain would thus come to be considered the expression of an altered structure, rather than of an altered function; and, if we argue from the analogy of known causes of pain, such as pressure, we may presume that some obstruction to the progress of the legitimate influence of the affected nerves exists, which obstacle we can hardly imagine unconnected with a physical change. From the same premises it would follow that, in reflex pain, the nerve affected must be itself healthy; otherwise, how could it convey correctly even a wrong impression? The singularity in these cases is the point at which the morbid sensation becomes developed, and which, though not yet reduced under a fixed law, is perhaps to be explained by the general remark of M. Valleix, above alluded to, respecting the sensibility of nerves towards their extremities.

We have now to apply these observations to the cases described, and to others analogous to them, where pain at the præcordial region is a prominent symptom. We have seen that it is not excited in healthy nerves, except by mechanical means, or by some change occurring in the surrounding tissues, or by special influences producing inflammatory action; and therefore, in the absence of the first and the last of these cases, we have only to inquire, what is the tissue affected? to which the nature of the pain often affords an answer. We are then to presume, that some change is going on in one or more of the organs which adjoin the seat of the pain. We are not to believe that a functional derangement of their nerves exists, at least if the case be at all recent; but, proceeding upon the first supposition, we must endeavour to discover the kind of change which is being effected, more particularly if it be of an inflammatory nature. If this point be made out, it is of little practical import, in the outset of the treatment, whether the mischief is caused by the liver or by the stomach, or whether it is due to neither. The former organ has much to answer for in the way of exciting diaphragmatic and even pericardial inflammation; though it would seem, from some late researches of Dr. John Taylor, that a faulty condition of the kidney is even more productive of pericarditis than rheumatism itself. When, then, the great depurating organs are at fault, certain tissues become affected; this brings us to the second subject of speculation.

Connexion of certain tissues with some painful disorders. The fibrous, fibro-serous, or fibro-cellular tissues seem peculiarly obnoxious to the evil influences of bad blood and bad climate. And, as if evil communications corrupt good manners in this as in other cases, these membranes involve the neighbouring nerves in the same disturbance, the consequence of which is, that their affections are very painful, often tedious, and generally liable to recur. For it seems to be a law of nervous matter, that, if once impressed with any peculiar action, it manifests a tendency to maintain the same. This, perhaps, is only a consequence of that property in such matter to resist change, by which our characters, aptitudes, and repugnances, remain the same from the moment of their full development until their extinction.

Accepting as a fact that fibrous, fibro-serous, and fibro-cellular tissues are extremely susceptible of anormal nutrition in some shape, we may recal to mind certain neuralgic phenomena, which perhaps may be independent of any source beyond the nerve affected, but which nevertheless deserve notice, on account of their propinquity to these structures. Of this kind are sciatica, lumbago, tic, pleurodynia, certain forms of headache, of rheumatism, of gout, and also some painful affections of the abdomen occurring in the course of Bright's disease, and sometimes terminating in ascites. These complaints, for the most part, own a humoral or an atmospheric origin, or one depending upon the joint influence of both; and, as their causes are known to affect fibrous tissues in preference to any other, it is only natural to presume some connexion between them and the nerves to which the mischief is referred. I often used to reflect upon the singularity of the fact, that, in facial neuralgia, the nerve did not become affected until its emergence from its bony tunnel; but this view of the case clears up that difficulty, and is wonderfully confirmed by the kind of treatment which is found most useful in such disorders, consisting of those remedies which tend to improve the condition of the blood, with other means directed to the same end.

Of the reason why these tissues should be affected under such influences, I can offer no explanation, unless we accept as such what has been often advanced before—that a lesser vital organization possesses a smaller power of resistance. Some peculiarity connected with the circulation of these parts may, as in the case of articular cartilages, perhaps enable us to make an advance towards discovery; but, in the meantime, we must rest satisfied with the fact, or with the sequence of facts, as we know them. A knowledge of them affords us a valuable means of diagnosis and aid to treatment, besides forming the starting ground for the philosophy of the question. Of course there is a great difference in the sensibility to pain in various individuals. Hunter says that animals with fair skin and hair are more susceptible of cold, as also of pain, than the dark. This is well known in the army, where we find that the power of bearing violence committed on the body is in proportion to the darkness of the individual. The late Sir Robert Peel was a striking instance of this peculiarity; and the truth of Hunter's remark is further borne out by the fact, that many fair and scrofulous individuals have great quickness of feeling and mental susceptibility. The structure of the nervous system must thus have a strong influence in determining the character of the individual,

which at one time was judged of from the form of the head alone, as indeed it very generally is at this day. The variety of the kinds of pain which may be excited in the same nerves is also curious, yet not more so than the numerous and contrary sensations which we experience through the same medium in a state of health, and by which we are enabled to characterise the properties of bodies, and to experience a gratification of many descriptions and degrees.

In this apparent complexity of function enjoyed by the cerebro-spinal nerves, does the sympathetic or its branches take any part? Dr. Sellar, of the Royal Infirmary of Edinburgh, attributes to the branches of this nerve the pain experienced in headache; and Professor Hughes Bennett states that through them the pain of colic, gall stones, etc., is experienced; and it is certain that mental emotion influences powerfully their organic action. But, after all, the question at present has no great pathological interest; for should we, by an unheeded-of accuracy in diagnosis, attain to a knowledge of the particular fibres involved in a case of neuralgia, we have no treatment wherewith to follow up such a transcendental discovery. It is time, also, that this vagrant discussion should terminate, though the subject and its collateral topics are well nigh inexhaustible. Yet one more remark is necessary as bearing upon the general conclusion; which is, that in very many cases, when the nervous matter is alone involved, no pain is felt, the only visible result being a cessation or modification of its action; and yet intense pain may be excited in a nerve by its being put upon the stretch, as by a spiculum of bone, or by a tumour. In these cases, to be sure, the pain is usually very intermittent; yet all pain is more or less so, for it is not conceivable that a nerve should have the power of maintaining a continuous action for an unlimited period.

The following are the inferences at which I arrive.

I. Setting aside mechanical agency of all kinds and reflex action, pain is incurred in healthy nerves by their participating or becoming involved in abnormal processes occurring in the tissues to which they are distributed, by which, if the process be long continued or intense, some change takes place, rendering them liable to be affected with pain upon the recurrence of a small amount of the original exciting cause, and without the concurrents which accompanied their first seizure.

II. It is doubtful whether the nerve alone suffers in such secondary or succeeding attacks, or whether the surrounding tissues are likewise affected.

III. Such incidents are most frequent when the structures concerned partake of the nature of fibrous tissue.

IV. Loss of tone, or diminished power of resistance, in the parts invaded, is frequently permanent.

V. This atony is most frequently local in its origin and extent.

VI. In such instances, it may arise from change of structure, inappreciable to our means of observation.

VII. If these premises are correct, it follows that, when pain occurs in the situations referred to, and lasts for any time, the treatment should be directed to favour the subsidence of the morbid action, as well as to neutralise the exciting cause; and that, for the first indication, the abstraction of blood is probably the most effective means.

VIII. When the tissues have lost their powers of reaction, and yield at once to a depressing influence, a tonic and alterative or depurating plan of treatment is to be followed.

IX. The vigour of the treatment is generally to be proportionate to the importance of the parts or organs concerned, and to the strength of the constitution.

Here it is assumed that pain is a certain index of abnormal nutrition on the one hand, and of altered function or structure upon the other; and, as the second condition is caused by the first, we must infer that if the first be warded off or mitigated, its consequences will not follow, or only in a minor degree; and if pain be the certain index of inflammatory action in such cases, and it be proved by experience that blood-letting, local or general, has the power of assuaging that pain, we can only suppose, at least in cases where tumefaction has not occurred, that it so acts by allaying the abnormal action.

The conclusions drawn from this short train of reasoning are opposed by a remarkable statement of Dr. Dietl of Vienna, as to the efficacy of blood-letting in pneumonia, which was noticed in the *Edinburgh Monthly Journal* for January 1851, and which is to the effect that, while 85 cases treated by bleeding alone gave a mortality of 20·4 per cent., 106 by powerful doses of tartar emetic alone 20·7 per cent., 189, treated by dietetic means only, gave the diminished per-centage of 7·4. Whether this statement be free from error or from fallacy, I am not enabled to declare; but the results are curious, and appear to be in contradiction to nature itself, which seeks relief in this disease by the effusion of blood, sometimes occurring very copiously, and seldom without apparent advantage. In other complaints, the same mode of relief occurs naturally; and if the healing art is to be founded upon an observance of the laws and operations of nature, we have certainly the sanction of the highest authority for continuing the practice of blood-letting, Dr Dietl's tables to the contrary notwithstanding. If the preceding remarks be correct, it must be of the utmost consequence to preserve the nerves of the inflamed part from permanent injury; and this consideration alone, were the relief to present suffering of no account, should preserve every honest pathologist from the venal paths of a do-nothing quackery.

Halifax, July 15th, 1851.