tinuity—namely, that till the last, even though reduced in dimensions, it shall retain some degree of its original firmness and tenacity. We know that antiseptic treatment has shown that a piece of dead bone may be absorbed, provided it be not putrid: the granulations that overlap superficially may, so to speak, erode it. It is not necessary for us now to consider how that is effected; but certainly, in some way or other, the granulations do what mere steeping in serum, whether putrid or non-putrid, never would do. Never, I believe, would the bone be dissolved by the serum. And just as a non-putrid sequestrum is served by the tissues, so is a well-prepared specimen of catgut; it is superficially eroded. I have here a stitch that I removed to-day from a wound made ten days ago—a wound made for stretching the anterior crural nerve, which was stretched, as well as the sciatic, in an aggravated case of sciatica. You may see that, as yet, it shows no signs of erosion. We know by experience that, if it were left three or four more days, we should probably find it eroded, as the former specimen shows; but, until nearly a fortnight has elapsed, erosion does not begin. It then proceeds gradually, and, therefore, the thicker the catgut, the longer is the time required for its complete removal. We may fairly consider that from a fortnight to three weeks is long enough for the persistence of a ligature upon an artery in its continuity. [Three days later I removed two remaining stitches in the case last referred to, and found both of them slightly eroded superficially.]

I have brought with me the carotid artery of the calf in which I first established the fact of the substitution of new living tissue for the dead old tissue of the catgut.* If any gentleman will examine the specimen after the meeting, he will see the ligatures of new formation incorporated with the external cellular coat of the artery. I have been strangely misunderstood as having intended to convey the idea that the catgut, when it becomes organised, comes to life again. Gentlemen, such an absurd notion certainly never entered into my head any more than, when I have spoken of the organisation of a blood-clot, I have meant by that expression to convey the idea that the blood-clot becomes organised by its own inherent virtue. I found the term "organisation" ready to my hand; it was no term of my invention. It was used with reference to lymph. Now pathologists, in speaking of lymph as becoming organised, did not, I suspect, mean by that expression to imply that it was the lymph-substance that had the power of self-organisation, as distinguished from any influence that surrounding tissues might exert upon it. So in the same way the expression "vascularisation of lymph" was used when it was universally believed by pathologists that the blood vessels were formed only as loops from pre-existing blood-vessels. Now-a-days a different view may be taken, but the term "vascularisation of lymph" was employed without any notion that the lymph itself created the blood-vessels. And so when I spoke of the organisation of the blood-clot or of catgut, I never meant to convey the idea that either the one or the other did the work itself. As to the blood-clot, we know that if it remains free from putrefaction among the tissues, it speedily becomes infiltrated with cells of new formation. Whether the white corpuscles originally present in the clot take any part in the formation of these new cells is a question now under discussion, and one, I conceive, not at all prejudiced by the use of the term "organisation of the blood-clot". With regard to catgut, I think if gentlemen would refer to my original paper in the *Lancet*, they would see that I stated very explicitly that new tissue forms at the expense of the old, that the old tissue is absorbed by the new, and that as the old is absorbed, new is put down in its place.

In conclusion, gentlemen, I venture to recommend the new chromic catgut as in all respects deserving of your confidence, and at the same time to thank you sincerely for the patient attention with which you have listened to this address.

* See *The Lancet*, loc. cit.

NATIONAL HOSPITAL FOR CONSUMPTION, VENTNOR.—The annual meeting of the governors was held at the offices, 12, Pall Mall, on Wednesday, February 2nd. In the absence of the president, Viscount Eversley, the chair was taken by Sir Harry Verney, Bart., M.P., vice-president. The report presented recorded a continuance of the efficiency of the institution, and that an increased number of patients had been benefited by treatment at the hospital during the past year. The receipts for the year amounted to £7,216, and the expenses to £7,380. Legacies amounting to £637 4s. 11d. had been received. H.R.H. Prince Leopold was elected president in succession to Viscount Eversley. The medical report was read by the hon. visiting physician, Dr. Sinclair Coghill, and it stated that 598 patients had been treated, the mortality being only 2.8 per cent. The report was adopted, and the meeting terminated with a vote of thanks of the chairman.

A LECTURE

ON

BACKACHE, AND THE DIAGNOSIS OF ITS VARIOUS CAUSES, WITH HINTS ON TREATMENT.

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

Professor of Clinical Medicine; Senior Physician to King's College Hospital.

GENTLEMEN,—The careful study of a particular prominent symptom, with a view to ascertain the various causes from which it may arise, is often of great practical utility. I propose now to make this inquiry with regard to the very common symptom *backache*. A patient comes to us complaining of pain in the back; and, as an essential preliminary to the suggestion of a remedy, we endeavour to ascertain the precise seat, the nature, and the cause of the pain.

I will first refer to the more common causes of backache, and afterwards to those which are of less frequent occurrence.

In the great majority of cases, the pain of backache has its seat in the muscles, and is a simple result of strain or over-fatigue of the lumbar and erectores spinæ muscles and tendons. Everyone must have had personal experience of the pain and soreness resulting from muscular fatigue consequent on any unaccustomed or unusually prolonged or violent exertion or strain. One remarkable feature of the pain which results from excessive muscular exercise is that, while it may continue more or less during rest in bed, it is usually much increased by the first movements after rest, but gradually diminishes after moderate exercise.

While investigating the various causes of muscular lumbago, it is well to bear in mind that standing still is more fatiguing for the legs and the back than walking, and that leaning forward puts a greater strain on the muscles of the back than standing erect. The backache resulting from fatigue of the dorsal muscles is often bilateral, and equally severe on the two sides; but not unfrequently it is confined to one side, or is much more severe on one side. This is accounted for by the common practice of throwing the weight of the trunk, while standing, more upon one leg; the spine being more or less laterally curved, and the muscles on one side, therefore, having a greater strain upon them than those of the other.

A common cause of painful overstrain of the dorsal muscles is an excessive weight in the abdomen, such as results from the advanced stage of pregnancy; an accumulation of dropsical liquid, whether ascitic or ovarian; or an excessive development of fat. It is obvious that the continued effort required to maintain the erect posture with an exceedingly ponderous abdomen must often cause a painful strain of the dorsal muscles.

I do not propose now to discuss the treatment of abdominal dropsy. Pregnancy in due course brings its own natural cure; and an excessive weight of fat may be lessened and regulated by a system of diet which reduces to a minimum the amount of oily, saccharine, and farinaceous articles of food. It happens to me very frequently to be consulted by fat men and women suffering from pain in the back, who come to me under the impression that their pain has its seat in the kidneys. For the permanent relief of these cases, I rely mainly upon the following dietary; and I have received many grateful acknowledgments of the relief thereby afforded.

Diet for Excess of Fat.—*May eat:** Lean mutton and beef; veal; lamb; tongue; sweetbread; soups, not thickened; beef-tea and broths; poultry; game; fish of all kinds; cheese; eggs; bread *in moderation*; greens; spinach; water-cress; mustard and cress; lettuce; asparagus; celery; radishes; French beans; green peas; Brussels sprouts; cabbage; cauliflower; onions; broccoli; sea-kale; jellies, flavoured, but not sweetened; fresh fruit in moderation, without sugar or cream; pickles.—*May not eat:* Fat bacon and ham; fat of meat; butter; cream; sugar; potatoes; carrots; parsnips; beetroot; rice; arrowroot; sago; tapioca; macaroni; vermicelli; semolina; custard; pastry and pudding of all kinds; sweet cakes.—*May drink:** Tea, coffee, cocoa from nibs, with milk, but without cream and sugar; dry wines of any kind in moderation; brandy, whiskey, or gin, in moderation, without sugar; light bitter beer; Apollinaris water; soda water; seltzer water.—*May not*

* If any of the above permitted articles of food or drink should be found to disagree, they are of course to be avoided.

drink: Milk, except sparingly; cream; porter and stout; sweet ales; sweet wines. As a rule, alcoholic liquors in any form should be taken only very sparingly, and never without food.

There yet remain for special mention some varieties of backache having their seat in the muscles. Amongst the patients who consult me under the erroneous impression that they are suffering from disease of the kidney, are a considerable number who, in addition to pain in the back, are alarmed by the turbidity of the urine. The urine is excessively acid, often of high specific gravity, and, on cooling, deposits an abundant sediment of urates. Neither albumen nor sugar is present; but an excess of nitric acid often causes a copious crystallisation of nitrate of urea. Most of this class of patients are dyspeptics, and not a few eat and drink to excess. Now there is good reason to believe that the backache and the muscular pains in the limbs of which these patients complain are the result of malnutrition and irritation of the muscles, consequent on some defect in the processes of digestion and assimilation. Muscular rheumatism may be a result of *muscular dyspepsia*. It is highly probable that, for instance, a mutton-chop—the muscle of a sheep—which should be so thoroughly digested and assimilated as to nourish and strengthen our human muscles, may, through some defect of the primary digestive or secondary assimilative processes, reach the muscles in a state unfit to nourish them, and rather calculated to fret and annoy them. Thus, in this form of dyspeptic myalgia, while the muscles are starved and tortured, their unassimilated nutriment is ejected by the kidneys in the form of urea and urates.

The successful treatment of this class of cases obviously depends upon our ability first to discover and then to remove the causes of the imperfect digestion, which is the primary source of the muscular pains. With this object in view, each case requires a separate and careful study, in order to discover which amongst the numerous causes of imperfect digestion is operative in any given instance. Amongst the most common removable causes of indigestion is imperfect mastication of the food, either from the loss of the molar teeth or the common habit of rapid eating without thorough mastication; the result being, first, that the food is not sufficiently mixed with the saliva which is poured into the mouth during the process of mastication; and, secondly, that the food is swallowed in large masses which are difficult of digestion. In a large proportion of cases, the diet requires to be carefully regulated as regards both quantity and quality, especial care being taken to avoid excess of any kind, whether in food or drink; and most dyspeptics should be warned to avoid soups, sauces, nuts, pickles, spices, salted, smoked, dried, potted, or otherwise preserved meats, on the principle that most *antiseptics* are *anti-peptics*, the process of digestion being, in fact, a form of regulated physiological fermentation; The following articles of food and drink are also more or less indigestible, and therefore to be avoided by dyspeptics: veal, pork, dried fish, lobster, salmon, pies, pastry, new bread, cheese, jams, raw vegetables, dried fruits, malt liquors, effervescing wines, liqueurs, cyder, and all stimulants without food.

There is a form of muscular pains from which young people often suffer, and which are commonly called "growing pains". These pains are, in fact, the result of over-fatigue of young and growing muscles. I have a vivid recollection of having suffered severely from these pains when I was a rapidly growing youth. The chief remedy or preventive is to be found in rest and the avoidance of over-exertion and fatigue, while the nutrition of the muscles is promoted by fresh air and wholesome food in sufficient quantity.

There is a severe form of lumbago which often comes on suddenly during the act of stooping to pick up something from the floor, or perhaps to pull on a boot. The patient, in the act of stooping or rising, is suddenly seized with a severe pain in the back, which is aggravated by every attempt to assume the erect posture. This sudden pain is probably caused by cramp or the rupture of some fibres of a muscle during the act of contraction. It is a well-known fact, that a muscle may be torn across by its own active contraction. The late Dr. Sibson, who was a remarkably fine muscular man, and much given to athletic exercises, was one day amusing himself by swinging a heavy wooden club, when, on stepping backwards, he had a sudden sensation of having been sharply struck by a stick on the calf of the leg. The muscles of the calf were found to have been extensively and deeply torn across; and the result was, that for several weeks he had to walk with crutches, while the suicidal muscles were undergoing repair. It is manifest that, short of such extensive injury as this, severe and prolonged myalgia may result from strain and mechanical tearing of over exercised muscles and tendons. There are few persons who have not had personal experience of the muscular soreness which remains often for days after a severe attack of *cramp*. The common exciting causes of cramp are fatigue and cold and disorders of digestion. An indigestible article of food,

which in one individual will cause pain and cramp in the stomach, may in another excite cramp in one or more muscles, thus affording another illustration of "muscular dyspepsia".

When the nutrition of the muscles has been impaired by long inaction, the result of confinement to bed by illness or a mechanical injury, such as a broken leg, pains in the back and limbs often follow the first attempts at exercise during convalescence; and these pains usually continue with more or less severity until by degrees the muscles regain their normal state of nutrition and vigour. It is often necessary to warn those who are attempting to strengthen their muscles by exercise, that over-exertion and fatigue tend rather to weaken than to invigorate the muscles.

Amongst the exciting causes of muscular pains, whether in the back or elsewhere, exposure to cold and damp is no doubt common and influential. A so-called stiff neck is often excited by a draught of cold air, and a severe attack of lumbago has often been excited by sitting or standing in damp clothes. For the relief of this form of myalgia or muscular rheumatism, the diaphoretic influence of a hot-air or Turkish bath, or of a warm-water bath followed by a vigorous rubbing or shampooing, is often very efficacious. Another useful local remedy is an embrocation composed of equal parts of linimentum belladonnæ and linimentum opii, either rubbed into the skin over the seat of pain or sprinkled on the rough surface of piline, which is then bandaged over the painful part.

Aneurysm of the Aorta.—Amongst the less frequent, but more formidable causes of severe and persistent backache, is pressure on the bodies of the vertebrae by an aneurysm of the abdominal or of the thoracic aorta. In all cases of severe pain in the back the possibility of aneurysm should be constantly borne in mind, and the signs carefully investigated. In case of suspected abdominal aneurysm, place the patient on his back, with the thighs flexed towards the abdomen, and the abdominal muscles relaxed; then press the ends of the fingers backwards towards the aorta, taking care not to mistake the merely nervous pulsation which occurs in excited states of the circulation, especially in anæmic women, for the expansive pulsation of an aneurysm. A soft blowing sound may always be excited by the pressure of the stethoscope on any large artery, but in most cases of abdominal aneurysm a more or less rough murmur is heard on applying the stethoscope even lightly over the pulsating tumour; and this sound, being conducted through the bones, is often distinctly audible at the back over the spinous processes of the corresponding vertebrae.

It not unfrequently happens that an abdominal aneurysm bursts, and forms a false aneurysm behind the peritoneum; and such a tumour, taking a lateral course towards the loin, may seem to be so remote from the aorta as to be mistaken for a tumour of a different kind.

In September, 1877, I had under my care in the hospital George V., aged 39, who for several months had suffered from very severe pain in the back and in the left loin and thigh. We found, beneath the false ribs on the left side, a soft pulsating tumour, over which a bellows-sound was heard. I took it to be a medullary tumour, so vascular as to give rise to the pulsation, and a blowing sound; the pain being caused by the pressure of the tumour on the lumbar plexus of nerves. In spite of the free hypodermic employment of morphia, the poor man died on November 4th, worn out by the pain, and we found that the tumour was a false aneurysm. There was a small opening at the back of the aorta, just below the diaphragm; and the blood, having forced its way behind the peritoneum, had quite surrounded the left kidney. There had been no escape of blood into the cavity of the peritoneum. A false aneurysm in this situation sometimes attains an enormous size.

On September 17th, 1872, I saw at my own house a gentleman, Mr. J. T., aged 35, who for fifteen months had suffered from severe pain in the back, and latterly in the left testicle. I found a pulsating tumour in the epigastrium, over which a loud bellows-sound was heard. The impulse of the aorta was distinctly heard over the lower dorsal spinous processes. Two days afterwards I saw him at his own house, and was told that the night before, while lying on the sofa, he had a sudden increase of pain in the left side of the abdomen, and appeared to be dying. He now complained of tenderness in the left loin, where I found a pulsating fulness over which a bellows-sound was audible. I concluded that the aneurysmal sac had given way, and a false aneurysm had formed in the connective tissue behind the peritoneum. On September 26th, I again saw him, and found that the pulsating tumour extended from the margin of the ribs to the crest of the ilium, and as far as the median line of the abdomen. He died a few days afterwards, having been seen in the interval by Sir James Paget and Sir William Gull, who confirmed my diagnosis. No *post mortem* examination was made.

I have met with two cases in which the diagnosis of abdominal aneurysm was rendered somewhat doubtful by the liver being placed in front of the aneurysm. The first case occurred in the hospital, under

the care of Dr. George Budd, when I was house-surgeon, in 1843. A man, D. M., aged 38, had suffered from pain in the back for three years, and for a year there had been pain in the right shoulder. A tumour, having the form and position of the liver, extended as low as the umbilicus. The hepatic dullness extended as high as the right mamma, and the lower ribs bulged outwards. Over the whole abdominal portion of the tumour a strong heaving impulse was felt, and a loud, rather rough murmur was heard. The murmur was also heard at the back over the lower dorsal spinous processes. After remaining some days in the hospital he died quite suddenly. I saw him, with my friend Dr. Russell of Birmingham, who was then house-physician, immediately after his death, when we found that the hepatic swelling had disappeared, and had been replaced by a feeling of fluctuation over the whole abdomen. The abdominal cavity was filled with blood, which had escaped from a ruptured aneurysm of the aorta, large enough to hold at least a gallon. The liver had become flattened and expanded over the surface of the aneurysm, so that along the longitudinal fissure the hepatic substance was not more than half an inch thick.

The other case was one, the history of which I published in the *Pathological Transactions*, vol. x, p. 99. A carpenter, aged 37, had suffered from pain in the back for a year before his admission into the hospital, December 31st, 1858. About seven weeks before admission he first detected a swelling at the pit of the stomach. There was a pulsating tumour at the epigastrium, rather to the left of the median line; above, it seemed to press beneath the ribs, but below it had a well-defined margin about an inch above the umbilicus. Its anterior surface was rounded and convex, and it distinctly descended during a deep inspiration. No murmur was at first heard over the tumour or over the spinous processes at the back, but on January 13th it was first noticed that a bellows-sound was audible, not over the most prominent part of the tumour, but at its upper margin, just below the ensiform cartilage. The sound continued to be heard from that date. The tumour appeared to increase in size, until it could be just covered by the half-closed hand. On February 6th, while he was sitting up in bed, he suddenly vomited a large quantity of fluid blood, his face became blanched, and he quickly died. After death, the tumour in the abdomen could not be felt. On opening the abdomen, it was found that the tumour which had been felt during life was formed by the lower margin of the right lobe of the liver. This portion of the liver was indurated by a deposit which was probably a syphilitic gumma, though he denied having had syphilis. The morbid mass was separated from the bulk of the liver by a deep fissure, evidently the results of atrophy of a portion of hepatic tissue. The liver weighed 3lbs. 14ozs. The semi-detached portion of liver before mentioned lay in front of an aneurysm, which sprang from about the middle of the abdominal aorta. It was about the size of the double fist; its pressure had caused erosion of the bodies of the second and third lumbar vertebrae, and its cavity communicated by a round opening, about two or three lines in diameter, with the lower portion of the duodenum. The stomach and the small intestines contained much clotted blood.

The phenomena in this case were very perplexing. The persistent backache, the pulsation, and the bellows-sound led me to the diagnosis of an aneurysm, but until the abdomen was opened I could not explain the movable tumour which descended at each deep inspiration.

Aneurysm of the *thoracic aorta below the arch* is, according to my experience, of less frequent occurrence than aneurysm of the abdominal aorta. It is usually associated with severe pain in the back, resulting from the pressure of the aneurysm on the vertebrae and the ribs. In one case which I saw, with the late Mr. Lavies, at the Westminster Prison, the physical signs were dullness or percussion in the left interscapular region, with an audible impulse and bellows-sound. In another case, seen many years since, with a deceased relative, in the Cranbrook Union House, the aneurysm had caused absorption of the ribs, and formed a prominent pulsating tumour below the angle of the left scapula.

Cancerous Glands in the Abdomen are amongst the comparatively rare causes of pain in the back. Within the last three years I have seen in consultation four cases of malignant disease, in which, there having been a pulsating tumour in the abdomen, the diagnosis between cancerous glands and abdominal aneurysm was in the earlier stages by no means easy.

CASE I. Mrs. H., aged 65, was seen with Dr. Butler, of Winchester, in July 1878. There had been constant pain in the back and in the left loin and thigh since April. The pain was worse after exercise. A pulsating tumour was felt at the epigastrium without audible murmur, but the pulsation was heard over the lumbar spinous processes. There was loss of flesh, which went on increasing. In September, a hard swelling was felt at the umbilicus, and another in the right groin,

which, as Dr. Butler in writing to me said, confirmed the diagnosis of malignant disease. She died at the end of December. In the meantime, the liver had become much enlarged; there was some jaundice, ascites, and swelling of the legs. There was no *post mortem examination*, but the disease was evidently malignant.

CASE II.—Mr. G. B., aged 38, seen, with Dr. Hearnden, of Sutton, and Mr. Drake, of Brixton, first in September 1878. In this case there was constant pain in the back, worse at night. A pulsation was felt, and a bellows-sound heard at the epigastrium, and my first diagnosis was aneurysm; but in the course of a few weeks, he rapidly lost flesh; and when I last saw him, in March 1879, he was much emaciated. He had been jaundiced for some weeks; there was ascites and some swelling of the legs. He died in April. There was no inspection, but it was undoubtedly a case of malignant disease.

CASE III.—Mrs. H., aged 67, seen with Mr. Holberton, of Hampton, in September 1878. There had been pain in the epigastrium and back for three months, uninfluenced by food; also loss of flesh and strength. There was a diffuse pulsation in the epigastrium without audible murmur. She continued to lose flesh and strength, the pain in the back continued, and towards the end there was vomiting. There was no inspection, but Mr. Holberton wrote to me that latterly he believed that both the stomach and the liver became involved in the malignant disease. She died in March 1879.

CASE IV.—J. T. A., aged 31, seen with Mr. James Connor, of Battersea, on April 4th and 30th, 1879, had pain in the back—worse at night—since January. The pain was not made worse by food, or by exercise. He was pale, and had lost flesh considerably. A pulsating tumour was felt in the epigastrium, and a blowing murmur was heard. He continued to lose flesh and strength, and died on October 5th. A large mass of cancerous glands was found "behind and below the stomach, and in front of the aorta," as I learn from my friend Mr. Connor, who made the *post mortem* examination.

In all these cases, it will be seen that pain in the back was a constant symptom. In all there was a pulsating tumour at the epigastrium; in two there was an audible murmur, while in the others no murmur was heard, though in one of these the sound of pulsation was conducted through the vertebrae to the back. It is remarkable that in two cases the pain was more severe at night, and in only one was it spoken of as made worse by exercise. The pain of abdominal aneurysm is usually relieved by rest in the recumbent posture, and aggravated by exercise. In all the cases there was a more or less rapid loss of flesh and strength, and death within a period of nine months from the commencement of the symptoms.

The persistent backache and epigastric pulsation are common to cases of abdominal cancer and aneurysm. In the former a blowing murmur is less common than in the latter. One main difference between the two diseases consists in the evidence of serious constitutional disorder, with progressive emaciation, and death within a year from the onset of malignant disease.

Disease of the Kidneys, although a less frequent cause of pain in the back than is generally supposed, is a not uncommon cause of more or less severe pain in one or both loins. The forms of kidney-disease which are the most frequent causes of lumbar pain are calculus in the kidney, but especially in the ureter, malignant or scrofulous disease with enlargement of the gland, acute congestive forms of Bright's disease, temporary blocking of the ureter by a blood-clot in cases of renal hæmorrhage, distension and dilatation of the pelvis of the kidney resulting from retention of urine, whether caused by stricture of the urethra, enlargement of the prostate, or paralysis or other morbid condition of the bladder. In some gouty and dyspeptic subjects, nephralgia appears to result from the highly acid and irritating quality of the urine. I do not propose now to discuss the diagnosis of the various forms of kidney-disease to which I have here referred. To do so would require more than one lecture, and I have discussed this subject fully elsewhere.

Gastric Ulcer.—It may be well to mention in passing that the pain of simple ulcer of the stomach is usually felt not only at the seat of the ulcer, which is generally at the lesser curvature or in the posterior wall of the stomach, but it is also referred to the corresponding spot at the back. This is an example of a referred or reflected pain.

Uterine Disease and Displacement.—Amongst the common causes of backache in females, are certain morbid conditions and displacements of the uterus, the diagnosis of which is important, inasmuch as many of them admit of much relief by suitable treatment. As this is a special subject of which I have little practical knowledge, I dismiss it with this brief reference.

Disease of the Bones of the Spine, and of the Spinal Cord.—Amongst the most serious forms of pain in the back are those which result from disease of the bony column, or of the spinal cord, or its membranes.

The most common form of disease of the vertebræ is the strumous, with angular curvature, and often with lumbar or psoas abscess. The bones of the spine, too, are sometimes the seat of malignant disease. The spinal cord and its membranes may become secondarily implicated in cases of primary disease or injury of their bony sheath, but more frequently disease of the cord and its coverings is unconnected with disease of the vertebræ. In cases of *spinal meningitis*, there is, as a rule, more pain in the back than when the substance of the cord is alone affected. The pain is usually increased by movement, by percussion on the spine over the seat of disease, and by hot applications to the surface. The pain is often referred to the extremities of the nerves which pass out from the part affected, and is commonly associated with numbness, a sense of tingling, and other perverted sensations.

A sense of constriction across the chest is a frequent symptom. There is often spasmodic twitching of the muscles; and in proportion to the affection of the substance of the cord is the frequency of paralysis (paraplegia) affecting the parts below the seat of disease, and implicating not only the voluntary muscles, but also those of the bladder and rectum, with resulting retention or incontinence of urine and fæces.

Disease of the spinal cord itself is usually attended with less pain than when the membranes are the seat of disease. Inflammation of the substance of the cord (myelitis) may quickly result in paraplegia, with little or no local pain in the back. In some cases of spinal hæmorrhage, too, paralysis below the seat of pressure has been associated with little or no pain; while, in others, more or less severe dorsal pain has marked the onset of the hæmorrhage.

Pressure on the spinal cord by a tumour, fibrous, strumous, or cancerous, has often been associated with severe pain in the back. In a case recorded by Mr. Shaw (*Pathological Transactions*, vol. ii, p. 24), paraplegia was caused by two scrofulous tumours occupying the interior and lower part of the spinal cord, and invested on all sides by a thin layer of medullary matter. In that case, the pain in the lumbar region was so severe that the symptoms were supposed to result from caries of the vertebræ; and the more so, as there was a slight projection of one of the lumbar spinous processes.

The pain resulting from a tumour pressing on the spinal cord is very variable. In one case quoted by Dr. Abercrombie, the first symptom was neuralgic pain in the arm, which diminished as paralysis came on; in another case, the patient had sciatic pain extending to the toes. Mostly the pain is referred to the back, and indicates the seat of the disease; thence it radiates in the direction of the nerves whose roots are invaded. When there is no actual pain, there may be modifications of sensation, such as a sense of coldness or heat, or sudden alternations of these; numbness and pricking, or formication. Next in frequency to pain are muscular contractions in the affected limbs, followed in some cases by rigid flexion of a limb, and attended by a great susceptibility to the excito-motor stimulus, and, in a yet further stage, by complete paralysis. In short, the effect of moderate pressure on the cord is to cause spasm and neuralgia, passing on, with increase of the lesion, to paralysis and complete anæsthesia.

I scarcely need warn you to be vigilant and careful not to mistake any of these formidable diseases of the spinal cord and its membranes for the muscular and rheumatic affections to which I referred in the earlier part of this lecture.

There is an acute and transient form of backache which probably has its seat in the spinal cord. I allude to the pain in the back which occurs at the commencement of many acute diseases, especially the febrile exanthemata, and which is usually much complained of during the initiatory fever of small-pox. In some cases which have proved to be nothing more serious than febrile catarrh, the initiatory backache has been so severe as to excite a suspicion of incipient small-pox.

EPILEPSY PRODUCED BY PICROTOXIN.—Drs. Chirone and Testa thus sum up the result of their researches on the action of picrotoxin, in the *Annali Universali di Medicina e Chirurgia* for April 1880. 1. Picrotoxin is capable of producing a true artificial epilepsy. 2. This epilepsy is independent of the psycho-motor centres; it is, indeed, more intense after their removal. 3. The picrotoxin acts first on the medulla oblongata and on the commissural fibres between the brain and spinal cord, and then on the spinal centres themselves. 4. This shows the existence of a functional antagonism between the psycho-motor centres, and the motor centres of the medulla oblongata and spinal cord. 5. The convulsive movements of the limbs produced by picrotoxin are due in the first place to its action on the medulla oblongata. This action is propagated to the spinal cord. 6. In the frog, the influence on the spinal functions is more marked than on the cerebral; while in higher animals the cerebral motor centres are more affected. 7. Cinchonidin is capable of producing epilepsy of cerebral origin; picrotoxin, epilepsy of spinal origin.

CLINICAL LECTURE ON SOME VARIETIES OF NERVOUS HEADACHE.

Delivered at the Samaritan Hospital.

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2. *Neuralgic Headache.*—In my last lecture (*BRITISH MEDICAL JOURNAL*, January 24th, 1880), I spoke of nervous headache, and I attempted to divide the subject into four varieties. I alluded to the characters of each variety, and I remarked that it was difficult to assign to each a separate and independent classification. To-day, I will devote myself to the consideration of that variety of nervous headache which is generally unilateral, seizing one side of the head, and is recognised as neuralgic headache. I say generally unilateral, because I have known the paroxysms of frontal headache to recur so regularly, and to last such a definite length of time, and, moreover, to produce such characteristic sensations belonging to the neuralgic type, as to bring them within this category, and to yield to the same remedial treatment.

I shall have to speak, as we proceed, of some curious features in connection with this form of headache, its mode of origin, severity, duration, and locality; how various are the phenomena in different individuals, though fundamentally agreeing in general principles. In support of these facts, I shall cite some examples, giving such an explanation as each case may appear to justify.

Neuralgic headache is a type that deserves our attentive study, since it is as common as it is obstinate to cure.

Just as recurring neuralgia of the sciatic nerve ultimately impairs the sensation of the limb, and weakens its muscular power, so will recurring attacks of neuralgic headache affect the nervous tissue of the brain, till the patient is no longer able to exercise his intellect as he did formerly, or even to undergo the ordinary avocations of life, without feeling a strain on his nerves, which is certain to become worse.

I would define neuralgic headache as that variety of the nervous form in which the trunk or the special branches of a nerve are affected. It is a local pain affecting one side of the head. Unlike frontal headache, it is an unsymmetrical pain; its origin is one-sided. Now, the fifth nerve, either at its origin, or in some part of its course, is oftenest implicated. Its deep origin from the medulla is significant, when we bear in mind that the centre of the vaso-motor system is also traced to the medulla oblongata. The transference of impressions due to peripheral irritation (through cold, decayed teeth, etc.) or to central mischief, from excessive or diminished blood-supply, depending on morbid vaso-motor conditions, or through mental troubles acting on the sensorium, can be readily understood, when this association of brain, medulla, and fifth nerve is remembered. In any particular case of headache, a correct and precise explanation of its pathology is uncertain, owing to the difficulty of tracing the fibres of any one peripheral nerve to its centre, and likewise to the innumerable complications which may engender fallacies in clinical examination.

I would, however, impress this point upon you, as it is worth our serious notice. The causes which invite nervous headache in most instances are the same, or closely allied to those, which originate neuralgic headache. Both constantly happen to the same individuals at different times, and one variety is succeeded by the other. Severe neuralgic headache is often the outcome of the nervous type, and, therefore, we should avoid falling into the error of regarding them as essentially different. They belong to the same great family of neural disturbances in the brain, they are intimately related to each other, and they only vary as to the features and mental proclivities of individuals springing from a common parentage.

There are seldom two cases of neuralgic headache precisely alike, either in locality of nerve-disturbance, or in severity; but, making allowance for age, sex, and psychological peculiarities, they have many points in common, and wonderfully harmonise in the several phenomena they induce, when the same set of nerves are involved, and one portion of the brain is congested or hyperæmic—which probably happens, if we may judge of the heat on one side of the head, the flushed cheek, and