CLINICAL LECTURE ON SACRO-ILIAC DISEASE.

Delivered in University College Hospital, London.

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THE disease of which I am about to speak to-day, gentlemen, is one which, perhaps, is not very common; but in fact it is only of late years that it has been recognised. It may be of some interest in the history of the disease for you to know that the first systematic description of it was given in this hospital by Mr. Erichsen, in a clinical lecture, which was published in the *Lancet*, in January 1859. Since that time, of course, the attention of surgeons has been drawn to the disease; and, therefore, you will find that, in most of the modern writers, mention is made of it. I have had a few cases of sacro-iliac disease in the hospital lately.

The first case was in a man who was in the hospital last year. He was admitted in May into the medical wards, under the care of Dr. Reynolds, for sciatica; but, an abscess developing about the pelvis, I was asked to see him some weeks afterwards; and I then diagnosed that he was suffering from sacro-iliac disease, so that my notes begin from that date, and I will give you a brief sketch of the history of the case from the notes of the ward-clerk.

The patient had been a soldier, and had been to India, where he had had dysentery, dengue fever, ague, etc. While in India, he also had an abscess in the perinæum.

Present Illness.—About the end of January or the beginning of February (the patient does not recollect the exact date), he was going up stairs to bed, after having been out for a short walk, and was seized with a sudden and sharp pain at the back of the left hip, and was unable to move for some few minutes; after which time he managed to crawl up to bed, where he remained for two days. The same evening, he sent for a doctor, who gave him some medicine, and a lotion to apply, and told him on the third day that he would be better if he could get about a little. He left his bed that day, and was able to move from one place to another with the aid of two sticks.

On 5th May, 1875, he was admitted, under the care of Dr. Reynolds, with sciatica. The pain was so great that he was ordered hypodermic injections of morphia every night. The patient complained of pain at a point on a level with and behind the great trochanter. The nature of the pain was continuous, with an occasional shooting. There was great tenderness downwards in the direction of the great sciatic nerve, which tenderness reached also round the loins. The patient could not stand well on the left leg, which seemed weaker than the right. There was a slight swelling in the position of the left sacro-iliac articulation, which was first noticed on July 5th. The swelling was regular, ovoid, fluctuating, and very tender on pressure. There was a slight curvature of the lumbar spines to the left side. The patient was thin and considerably emaciated, pale, and anæmic. He lay on the right side, with the left hip flexed at a right angle, because this position was the most comfortable for him; he could, however, also lie on the left side. There was no irregularity of the spine; but on the left side, opposite the two lower lumbar vertebrae and the upper part of the sacrum, there was very great tenderness; and, immediately to the left side of this, there was a swelling extending outwards four inches and three and a half inches from above down. Fluctuation was superficial, and there was considerable tenderness over the swelling. There was distinct impulse on coughing. The tumour was dull on percussion. A very slight tap on the crest of the left ilium caused very considerable pain, which he referred to a line corresponding to the left iliac synchondrosis. No abscess could be detected in the groin along the course of the iliacus muscle. The movements of the hips were free, and caused no pain, except when extreme flexion or rotation was practised, and then the pain was referred to the side of the sacrum. Tapping the great trochanter or the heel produced pain of the same kind. There was considerable wasting of the left lower limb. The patient could stand and walk with the aid of two sticks. Standing on the right leg only could be managed without much difficulty, but it was almost impossible for the patient to stand on the left leg. On his admission into Ward I, Mr. Heath ordered a broad bandage and plaster to be applied tightly to the hips, so as to keep the pelvis firm.

On July 18th, another swelling was noticed about the size of an egg,

communicating with the other one. In this, as in the other, there was a distinct impulse on coughing.

July 24th. The swelling had increased in size. The pain in the back was still very bad.

July 27th. The patient was aspirated to-day, and about half an ounce of thick creamy pus was withdrawn. Collodion and lint were applied, and strapping.

July 30th. The swelling had increased in size, and was nearly the same as before.

August 19th. The patient was aspirated again to-day, and was discharged with a tight-fitting belt.

Now, here we have a clear history of the symptoms of the man at the time he was admitted; and let me particularly draw your attention to the fact of his being unable to stand on the affected side, though you must remember that we have other diseases which prevent the patient from standing on the affected side. He had wasting of the left hip and left limb, which was simply due to his not using the limb. Any limb will waste if you do not use it, so you must not lay too great stress upon it as a sign of the disease.

This case was, comparatively, an easy one. There was a well-marked abscess at the time when I saw the patient; and, on pressing the two ilia together, the man complained of considerable pain over the sacro-iliac joint. The abscess was aspirated more than once, and I had the man fitted with a belt, and eventually he was able to leave the hospital in a tolerably fair condition; so, although his stay in the hospital was rather a long one, he went out in a favourable condition. I have not heard anything of him since; but I dare say I should have done so if he had not gone on well.

The second case was that of a woman, who was admitted for the second time last year. She was under my care three years ago, because then she had a swelling of the *right* iliac fossa, which was aspirated and thirteen ounces of fluid withdrawn. Although I tested her for sacro-iliac disease then, I could not detect any. She went out, and remained without any particular ailment until she was readmitted. And then there is this curious point in this case, viz., there was a history of previous illness ten or twelve years ago, when she suffered from fistula and two pieces of bone were taken away.

Condition on Admission, September 26th, 1875.—In the left iliac fossa, just above Poupart's ligament and over the iliac artery, was a very hard, round swelling, of the size of a small orange. It was fixed to the iliac fossa and did not pulsate. The upper edge was distinctly rounded, and the margin could be felt all round. It was very tender. The patient complained of a sharp cutting pain over the abdomen and down the thigh. She was not anæmic, and was fairly nourished. There was no tenderness over the spine, nor at the sacro-iliac synchondrosis.

I tested her for tenderness, imagining that there was caries and abscess connected with diseased vertebrae; and I may say that the case was complicated by her having a fibrous tumour of the uterus, which I got Dr. Williams to examine.

October 21st. Outside the lump above described, there was a soft, rounded, distinctly fluctuating swelling, which had gradually increased during the last three or four days. In the afternoon, I drew off seven and a half ounces of thick greenish pus, without odour. She had some little fever after that.

November 27th. I again aspirated, and drew off about eight ounces of pus from the left iliac fossa.

December 15th. The patient complained of pain in the back; and said that, when she put her heel to the ground, she felt as if a knife were run into her over the sacro-iliac synchondrosis. This was the first time she complained of the characteristic pain of sacro-iliac mischief.

January 28th. The patient had the abscess in the left iliac fossa aspirated, and eight and a half ounces of pus, with a little blood, were withdrawn.

February 10th. Just inside the anterior superior iliac spine, on the left side, was a swelling as large as a pigeon's egg, fluctuating, becoming tense on extending, and relaxed on flexing the thigh. By pressure in the iliac fossa, the swelling was made decidedly tense. She complained of startings, pain, grating in walking, and had very little control over her limbs. After that, she had a pelvic band fitted on, consisting of two bands passing round the pelvis and fastening on a broad pad in front of the pubes, with elastic-bands passing round the thighs, and fastening to the pad in front. Subsequently, she was discharged without any further tapping, and went to Walton.

She applied here again last July, wishing to be tapped; for the abscess had refilled. Finding that I was going out of town, she said she would not come in then, but would wait till I returned. When I came back in September, she called here to tell me that the abscess had entirely disappeared; that it had discharged from the rectum. I exa-

mined her, and there was nothing to be felt. Fortunately for her, no gas found its way from the rectum to the abscess.

The third case is one that is now in the ward. She came here because she was lame, and we were told nothing more than that; and she being exceedingly deaf, it was rather difficult to make out anything at the time. I examined the patient in her clothes, and found nothing wrong with the hip-joint, and did not detect anything more then; but Mr. Gould called my attention next day to a considerable abscess in the left iliac fossa, which abscess, somewhat unusually I think, took the course down the psoas muscle. The history of this last case is rather obscure, but it is this.

Lucretia A—, aged 25, single woman, was admitted September 18th, 1876. For nearly six months past she had felt pain in her left groin, and also across her loins, especially after standing or walking for any length of time. The pain was always greatest towards evening, but was relieved by lying down. Three months ago, she noticed a swelling on the inner side of her left thigh, which increased in size towards evening. She often felt pain right down her leg, and could not bear to walk far. She said her leg became stiff when she attempted doing so. She had never had rheumatism, nor been injured in any way that she was aware of. Two years ago, she said, her abdomen and legs were very much swollen, her bowels were confined for a week, and she passed no urine for a fortnight (?). She had been out of health for the last two or three years, but she did not complain of anything in particular.

Present State.—The patient complained of constant pain just above the left ilium, which prevented her from walking. Percussion of the trochanter or heel, and forcible rotation of the femur, were said to give pain. There was distinct fulness above Poupart's ligament, and outside the line of vessels, with distinct fluctuation transmitted from this to below Poupart's ligament outside the vessels; also fluctuation was distinctly felt on the inner side from the iliac fossa to the inner side of the vessels. The hip-joint could not be placed absolutely straight, and was kept very slightly flexed. There was no prominence of any vertebra. Percussion over first and second lumbar vertebræ caused pain. She complained of pain on pressure on the ilia. There was no shortening of the limb.

October 8th. I aspirated, and about three ounces of creamy pus were withdrawn. What we have done in this case was, to fit the patient with a belt and tap the abscess. The belt which I have fitted consists of two pads pressing on the pubes, straps passing twice round the body, and then perineal bands put on, which keep it from riding.

Now we pass on to the symptoms and nature of the disease. Take a case of pain about the region of the hips, what are the symptoms which would lead you to conclude that it was sacro-iliac and not hip-disease? First, motion is limited in hip-disease, you cannot move freely the thigh because the muscles prevent it; but in sacro-iliac disease, if you take the precaution to fix the pelvis, you will find that you will be enabled to get all the movements of the hip, which shows that it is not hip-joint disease. When the patient stands, the diseased seems to be a little longer than the healthy side; and if you examine carefully, you will find that the lengthening is real lengthening; that the anterior superior spine is a little lower down than on the opposite side.

In looking over Professor Sayre's *Lectures on Orthopaedic Surgery*, I find he has given a couple of drawings of sacro-iliac disease. The point they show, as you will see, is the wasting of the buttock, and that the patient's body is thrown to the healthy side, the object of the patient being to take the weight off the affected side. There is no doubt about this, and it is important to remember that the patient throws his body to the other side.

Abscess may form either in the iliac region, or behind in the sacral region, or you may have it taking the place of psoas abscess. It is very important that you should make out the nature of the abscess at once, because of the treatment. You know you may have abscess around the cæcum—perityphilitic abscess, from inflammation about the cæcum—and this occurs only on the right side; but, on either side you may have abscess connected with the kidney, and it may be very difficult to tell by the symptoms whether it be due to sacro-iliac disease or to kidney. You may have abscess connected with hip-joint disease, and if you see the patient in the earlier stage you might mistake it for sacro-iliac disease. You may have abscess from diseased vertebræ, in the lumbar region, or disease in the iliac fossa itself; and you must not conclude, therefore, that it is sacro-iliac disease because of the abscess alone. The best diagnostic point is the pain produced by firmly pressing the innominate bones together, or striking the two iliac crests with the balls of the thumbs. The patient suffering from sacro-iliac disease complains immediately as a rule, and refers the pain to the affected joint. In some cases, however, pressing the parts

together is not sufficient, and it is well then to try and draw the bones asunder, which will almost certainly show whether there is a tender joint or not.

Hilton has called attention to the fact, that the obturator nerve passing from the pelvis through the obturator foramen down the thigh, may cause pain on the inner side of the thigh during sacro-iliac mischief. I mention it here, and give his authority, because I do not happen to have a case to illustrate the point.

With regard to the cause of sacro-iliac disease, I may tell you that the first case I ever saw was in a young woman who had had children very rapidly; and I believe this is a very common cause. You will find that a weak woman has a child with a large head, and there is some difficulty in the head passing at the time of birth, and the mother is ailing and lame when she begins to get about.

Another is injury. Sayre says that he has met with it in children, but I have never seen a case. You may, however, trace it sometimes to direct injury, as we found in that man who had a fall upstairs. I am quite sure I have seen pain in the joint connected with gout. Only a few weeks ago, a gentleman came to me for pain in the back, for which he had had the routine treatment for lumbago; and, as a last resource, I struck his pelvis, which caused pain. He was a very gouty subject, and I then knew that he was suffering from a little gout in that joint. I put him on alkaline remedies and gave him a belt, with complete relief.

Treatment.—The great secret, I believe, is perfect rest; and the reason I say so is, because I have proved it experimentally, and because I can show you here specimens of recovery from sacro-iliac disease. If we keep the joint quiet we get ankylosis; that is, growing together of the two surfaces of the joint.

I have here some bones showing the results of the disease. Here is a joint where there is perfect ankylosis; here is another, which is not quite ankylosed; and here is a third, where the sacro-iliac joint is not only ankylosed, but there is ankylosis of the bodies of some of the vertebræ as well. Seeing that we have here a method of cure, we must assist nature by keeping the joint perfectly at rest, and the difficulty is in doing that, because you will observe that you should not keep the hip quiet, but only the pelvis. Mr. Huxley made me this instrument, which answers very well. The two pads over the pubes, and the belts going round the pelvis, keep it firm, and do not interfere

with the patient's movements, but it is generally advisable to add two perineal straps (not shown in the drawing) to keep the belt thoroughly in position. Is any operative proceeding necessary? Mr. Erichsen does not approve of operative interference, but recommends simply opening the abscess. Bryant speaks of having more than once opened the sacro-iliac joint and removed diseased bone, but I have never met with a case requiring such treatment. I see that Sayre, too, speaks somewhat in the same way. He says here: "If the disease has progressed, and suppuration becomes established, then, instead of cauterisation, lay the parts open freely, passing down until you have laid the joint bare, and, if the probe detects dead bone anywhere, follow it up by freely laying the sinuses open, or make counter openings, and gouge it out, for it must be removed before the patient can get well." He also recommends extension and counter-extension, but I do not think extension is necessary. Sayre says, "if the case is one of long standing, and there is more or less deposit in and about the joint, or if the inflammation does not readily subside, application of the actual cautery directly over the sacro-iliac articulation will be of the greatest service"; but I cannot recommend the treatment from my own experience.

I cannot but think that operating is a very serious matter in these cases. I believe the great secret of treatment is, to take the cases early, and not to treat them by extension and counterextension, but to lock the parts thoroughly together. Our object is to give the patient rest, which I do not think he will get by pulling at the limbs, for it must be remembered that we are not dealing with a joint in which the articular surfaces can be separated. I have proceeded on this plan, and I must say that our cases have done very well.

THE ESTIMATION OF THE QUALITY OF POTABLE WATERS.*

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THE object of this paper is :

1. To draw attention to the increasing practice of analytical chemists and civil engineers in giving opinions upon the suitability of a water-supply for consumption by a human population ;
2. To show the mischief that is done by such opinions in preventing the introduction of a proper water-supply into our large towns ; and
3. To prove that the determination of the suitability of a water-supply, in relation to the public health, is exclusively a medical question—one for the physician, who has specially studied sanitary subjects.

I will confine myself to a single illustration—the water-supply of a single town. But that illustration, I think you will agree with me, is a notable and sufficient one. I refer to the present water-supply of Perth, once the capital of Scotland, but now an eighth-rate town of about 26,000 inhabitants. It is the capital of a county which is, perhaps, better supplied with natural reservoirs of water, suitable for the domestic use of towns, than any other county in Britain. These reservoirs consist of the numerous lochs (or lakes) scattered over the district, the most important of which—as it is the feeder of the Tay—is Loch Tay. This loch is fifteen miles long, one broad, one hundred to six hundred feet deep, and three hundred and fifty-five feet above the sea-level. But there are also Loch Earn, Loch Rannoch, Loch Katrine, and many others—all of them situated in the area of the Lower Silurian rocks, an area that supplies the best potable water of this country. One of these lochs (Loch Katrine) furnishes the water-supply of Glasgow ; another that of Crieff ; and they are the natural sources of supply for Perth itself, as well as for all the towns or large villages of the county.† No doubt they are at considerable distances from Perth—fifteen or twenty to fifty miles. But this is no serious objection when public health is in question ; and when we consider from what distances other towns have not hesitated to bring their water-supplies, what the old Romans thought of distance in such a matter, or how the gold-diggers of our colonies dispose of such a difficulty.

But, in addition, the county of Perth is drained by the largest river in Britain, the Tay—a river with a basin of 2,500 square miles ; receiving, above Perth, a number of important affluents, such as the Lyon, Tummell, Garry, Isla, and Almond. The river itself flows through the town of Perth, dividing it into two unequal halves.

You will naturally suppose that, with such an affluence of suitable water for domestic supply and other purposes, Perth should be the best water-supplied city in Britain ; and you will probably be astonished when I tell you that :

1. The water-supply of the town is drawn from the river after it receives the town-sewage, which consists of—(a) The excrements, fluid and solid, of 26,000 inhabitants ; (b) The excrements of domestic animals—horses, cattle, and pigs especially ; (c) The outpourings of dye-works—among the largest in the kingdom—tanneries, and other public works ; and (d) The drainage of two overcrowded graveyards. And the river contains further, the sewage of all the towns and villages on its banks, or on those of its tributaries above Perth—including Dunkeld, Aberfeldy, Coupar-Angus, and Blairgowrie ; with the refuse of the numerous public works which take advantage of the water-power of the river or its affluents.

In other words, the river Tay at Perth is a huge river-sewer ; and it is from the river-sewage, filtered naturally, that the town of Perth takes, and proposes continue taking, its water-supply.

* Being a paper prepared for the Public Health Sections of the British Medical Association meeting at Sheffield, August 1876 ; and the National Association for the Promotion of Social Science meeting at Liverpool, October 1876.

† Had it been possible for Perth and Dundee, Forfar and Brechin, and other towns of Perth and Forfarshires, so far to have forgotten their local interests, prejudices, and jealousies, as to have harmoniously co-operated for a great common good, Loch Tay might have afforded to all of them, by conjoint waterworks, an unfailing, unlimited, unobjectionable, and economical water-supply.

2. This water-supply, however, is available for only a portion of the inhabitants, who have, instead of fifty gallons per head per day for all purposes, under twenty.*

3. Not only so, but there is absolute scarcity and insufficient pressure in case of fire.†

4. A large portion of the inhabitants—those who occupy the better parts of the town, its suburbs, rising to elevations of 200 to 300 feet—are dependent for their water-supply on surface or well waters—drainage-water—contaminated with the manure washed from fields, gardens, farm-yards, and roads.

5. And, in addition to bad quality, such is the scarcity in summer of this kind of water-supply that it is common for residents in the suburbs to borrow from each other ; while even whole suburbs and important public institutions therein have to resort to the cartage of water from the distant river ! In other words, there is frequent short supply for (a) drinking, (b) cooking, (c) ablution, and (d) flushing drains.

This being the case, and having been the case, to my own knowledge, for at least twenty years, with no indications of any movement for an improved water-supply, I took advantage of an opportunity offered me by a local scientific society, in February last, to draw the attention of the people of Perth to the unsatisfactory state of their water-supply in relation to public health. I described the river at Perth as virtually a common-sewer on a large scale ; and denounced all sewage-water, however diluted and filtered, as unsuitable for domestic use as a potable water—having special reference to the ease with which unobjectionable water, in any quantity, may be introduced into the town, as well as to the natural tendency of rivers, such as the Tay, to become annually more and more polluted.

The people of Perth have long laboured under the complacent and egotistical delusion that, sewage here or there, the river-water below Perth “is the finest in the kingdom for drinking use” ; and, unfortunately, they have never had any difficulty in getting analytical chemists and civil engineers to confirm them in their serious error. In order, apparently, specially to neutralise the effect of the opinions which I publicly expressed on the subject in February, the Water Commission and the citizens of Perth have lately had reports regarding the quality of the river-water—in reference to its use by the inhabitants for drinking and other domestic purposes—from an analytical chemist, Stevenson Macadam, Ph.D. of Edinburgh, and a civil engineer, James F. Bateman, C.E., of London.‡

Dr. Macadam says, as the result of a couple of analyses of bottled samples of water sent to him by the Water Commission : “I am of opinion that the waters are of wholesome quality and may be confidently employed for domestic supply, including drinking”. He describes them as “free from contamination with noxious element, either of an organic or inorganic character”.

Now, it has been abundantly proved of late years, that : 1. Chemists utterly fail to detect those matters in sewage which are most dangerous to human life, which escape filtration, are invisible to the naked eye—sometimes even to the microscope—and nevertheless produce wholesale disease in man—the germs of zymotic disease.§ And it has equally been shown that : 2. Even were chemical analysis capable of detecting what the Registrar-General of Deaths in London calls “zymads”, chemists are at irreconcilable variance among themselves|| as to their modes of analysis—some of the most eminent chemists in this country, for instance, denouncing as

* In Rome, of whose unhealthiness, real or alleged, we hear so much, there is a water-supply of no less than three hundred and seventeen gallons per day to each inhabitant, from four aqueducts alone, besides further sources, which render its water-supply “enormous”, according to Dr. Lachlan Aitken of Rome.

† This has repeatedly been pointed out by the sanitary inspector, who is also the head of the police force, Captain Welsh ; and it was, unfortunately, only too well illustrated at a fire in St. John Street in October 1876.

‡ In the belief, apparently, that my opinions must have undergone modification under the influence of Dr. Macadam's analyses and positive assertions, the said Commission applied to me by letter in July 1876, to ascertain whether and how far my opinions had undergone change. My published reply gave me the opportunity of more emphatically expressing my belief that the determination of the quality of a water-supply in relation to human health is exclusively a medical—not a chemical or engineering—question.

§ In August last, I put the question to Dr. Klein, by letter, whether he could conceive the possibility of a chemist detecting zymotic germs in water. He was kind enough to reply at once. “A chemist cannot distinguish innocuous sewage from sewage containing specific germs of disease. Even the microscope is unable to detect matters deleterious to health which may be present in water.”

|| In illustration, I need only cite two recent public trials in Scotland, which are types of incidents that are constantly occurring in all parts of the three kingdoms. I refer to—1. The Bunchrew (Inverness) bone manure case, tried before the Court of Session, Edinburgh, in March 1876 ; and 2. A crucial butter case, tried before the Sheriffs' Court, Glasgow, in July and August 1876. In both of these cases, it so happened that Dr. Macadam held opinions that were pronounced erroneous by the issue of the trial ; which issue was determined by the concurrent evidence of numerous other analysts, including those employed by Government at Somerset House.