

shows us conclusively that the column of Goll contains fibres arising in the posterior roots; and, if we do not admit that the lesions of the posterior column in pellagra are due to alterations of the posterior roots, how does it happen that the region occupied by the column of Goll is sclerosed? I believe that this apparent contradiction can be satisfactorily explained by assuming that all the fibres passing through the area of the so-called column of Goll have not the same origin,—and this has been found to be true in regard to other regions of the posterior column (middle root-zone of Flechsig). According to my view of the matter, a certain number of fibres in this area are the direct continuation of the posterior roots, while another series of fibres are connected with the cells of the grey matter of the spinal cord. In all probability the course of the latter, like those derived from the posterior roots, is ascending, for in transverse lesions of the spinal cord they do not degenerate in a descending direction. It is, moreover, likely that they establish a system of communication between the different levels of the grey matter of the spinal cord, though probably shorter than the fibres of radicular origin.

A direct proof of the existence of such fibres, I admit, is not obtainable in the present state of our knowledge of this subject. Nevertheless, we are in possession of a certain number of facts which point in this direction.

In the first place I wish to call your attention to the circumstance that, in our sections of pellagra (Fig. 4), the area of the column of Goll is far from being altered to the same extent throughout the whole length of the spinal cord. In the lumbar region it is not changed at all, and but very slightly in the inferior dorsal region; but, beginning at this point, the sclerosis goes on increasing, until it reaches its maximum in the cervical region. It is thus evident that the alteration of the tract of Goll increases rapidly in ascending, which is exactly the contrary of what takes place in a case of degeneration of the column of Goll properly so called, consequent upon a lesion of the posterior roots. It is well known that, in such cases, the sclerosed area grows narrower and narrower, at the same time becoming reduced, as to its antero-posterior diameter, to such an extent that, in the cervical region, the sclerosis is often found to be confined to the posterior half of the column of Goll. These differences between the sclerosis of the tract of Goll in pellagra, and that in ascending secondary degenerations of radicular origin, seem to me highly significant, being sufficient, in my opinion, to demonstrate that they are due to an entirely different process. The fact that, in pellagra, the extent of this sclerosis varies considerably in changing from one level to another is a strong argument in favour of the opinion that it originates, at least partly, in the very segment of the spinal cord, where it is found to exist. This view will certainly appear to you still more likely to be correct, when you compare the various areas of Goll represented on our sections (Fig. 4, Cerv. II and I) for I do not believe that, with no greater difference of level than that separating two contiguous cervical roots, it would be possible, in a case of secondary degeneration, to find such variation in the configuration of the sclerosed area.

There is yet another argument, this time of an anatomical nature, which speaks in favour of the endogenous origin of the alterations of the tract of Goll in pellagra.

If you examine the sections of the spinal cord of a foetus designed by Flechsig (Fig. 8), you will find, in the area of the column of Goll, a tract marked with stippling, in order to indicate that its fibres are not as yet developed (the foetus being 35 centimetres in length). Seeing that the other portions of the posterior column formed by the fibres originating in the posterior roots (with the single exception of the internal posterior zone to which I have referred above), are already provided with sheaths of

cord, and very likely from those which we know by the name of "cells of the posterior column." You will notice, besides, that, as I have already indicated to you, the pellagrous lesions of the internal posterior zone and of the tract of Goll may be placed so as to almost exactly cover Flechsig's illustrations of their foetal development (Fig. 9). If we then admit the endogenous origin of the lesions of the internal posterior zone, we must for the same reasons admit a similar origin for the lesions of the tract of Goll.

But the objection will probably be made that it is impossible to deny—given the results of the study of secondary degeneration—that the column of Goll receives a large number of posterior root-fibres. This is indisputably true; but, as I have already stated, it is my opinion that these fibres of exogenous origin are intermingled with the endogenous fibres in question, and it is even possible that they mutually exchange collaterals (which, however, must be left to be determined by future anatomical researches).

In short, according to my view, there are two kinds of fibres to be found in the tract of Goll: some, of *exogenous origin*, coming from the posterior root-fibres; others, of *endogenous origin*, coming from the "cells of the posterior column" situated in the grey matter of the spinal cord. This opinion, besides, is in entire harmony with the phenomena of development observed by Flechsig, seeing that this author explicitly declares that he has found, in the tract of Goll, fibres presenting two very different degrees of development: one series already provided with a sheath of myelin (my exogenous fibres), and another series as yet consisting only of an axis-cylinder (my endogenous fibres).

If then we sum up what I have endeavoured, and I hope successfully, to prove to you in the course of this lecture, it is this: (1) that all lesions of the posterior column noticed in certain affections of the spinal cord must not be considered as invariably due to tabes; (2) that there is a certain number of lesions of the posterior column caused by an alteration of the grey matter of the spinal cord. In concluding my lecture, I desire to emphasize once more that hypothesis obviously plays a considerable part in all what I have said on this subject, and I must confess that the uncertainty surrounding this little space in the cephalo-spinal axis, which we call the posterior column, is well calculated to make us realise how little we know about it, after all.

Original Articles.

COCCYDYNIA; DIFFERENTIATION OF CASES AND OF TREATMENT.

By RICHARD BARWELL, F.R.C.S. (Eng.)

Just fifty years ago Dr. J. C. Nott of New York, and about fifteen years afterwards Sir J. Simpson, described a painful condition of the lower end of the spine under the name of *coccydynia*, which has since been shortened into *coccydynia*. Both these writers gave a general picture, or rather sketch, of the condition, and both proposed and practised one of the operations to be hereafter described, sometimes with, sometimes without, success. They did not, nor as far as I can find have any subsequent writers distinguished between different classes of cases, to which circumstance failure in a certain percentage of operations may be justly ascribed.

Coccydynia is much more frequent in women than in men. Some small part of this preponderance is caused by greater nervous susceptibility and by certain uterine conditions; but by far the greater part is due to the wider interval between the tubera ischii, exposing more readily the end of the spine to injury by blows, falls, or pressure. It affects all ages, though it is somewhat rare in children and young women, and is, according to the statistics which I have collected, quite as frequent after the menopause as during the continuance of menstruation.

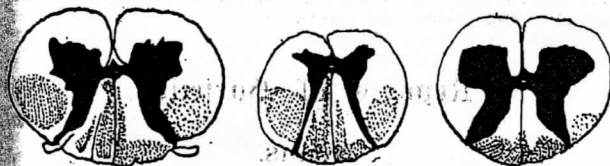
In the following table I have noted the ages at which the disease began:

Previous to 17 years	2
Between 20 and 30 years	21
30 and 40	15
40 and 50	10
50 and 60	4
Over 60	4
Total number of cases	56

It seems as if, in pellagra, this primary poliomyelitis were particularly pronounced in the lower cervical and the upper dorsal regions.

Dr. Nott also practised extirpation of the coccyx with rather discouraging results.

Not all the cases in the table were operated upon; some were cured by other treatment, one or two got so much better as to hope to still further improve and to escape operation, others were lost sight of.



Middle cervical region. Middle dorsal region. Lumbar enlargement.

Fig. 9.—On each section, to the left, Tuzcek pellagra (Grillenzone); to the right, foetal stage of development (Flechsig).

This comparison of the lesions of the pellagrous spinal cord with those parts of the foetal spinal cord, which are not as yet provided with sheaths of myelin, shows an almost absolute resemblance, at least as regards the middle dorsal region and the region of the lumbar enlargement. This resemblance tends to prove that, in these different zones, there exist fibres not originating in the posterior roots.

myelin, it follows that the tract in question must *a priori* be considered as not composed of root-fibres. And if this tract be not formed by root-fibres, the fibres of which it is made up in all probability come from cells of the grey matter of the spinal

The causes of the condition are various; occasionally there is no traceable history of injury, but for some time previously considerable loss of health, frequently induced by anxiety, disappointment, residence in unsuitable relaxing air, or by continual over-fatigue, specially if accompanied by prolonged sitting on a hard seat. In most cases there is some history, generally volunteered by the patient, of some injury, as a fall on the buttocks, a blow, sitting for a long time, even after the position had become irksome, on a hard or badly stuffed seat. Any one of these causes may give rise to inflammation of the coccygeal joint, and; though I consider this very rare, I am bound to say that in one of my operations I found it falsely ankylosed. Two of my patients, one in the 3rd, and one in the 5th, category, attributed the condition to difficult and painful passing, with much straining, of a hard, large motion. In some cases the origin lies in a painful fissure of the anus or in a blind internal fistula, either overlooked or imperfectly cured.

If, from shyness and dislike of mentioning such a thing, the patient have allowed either of these troubles to go on for some time, curing the original condition does not always effect a cure of the coccydynia, which may persist almost as bad though the rectum and anus be sound. Only one patient gave as a cause the birth of a large infant. I had doubts of the correctness of this view, because the pain had not commenced until seventeen months after the event.

As the name indicates, the disease is essentially characterised by pain, which in some cases is constant, the patients asserting that it keeps them awake at night, and that even while asleep they never entirely lose the consciousness of it. This persistent pain is varied by sudden paroxysmal exacerbations, even though the patient may be lying perfectly still; they are often so severe as to cause a start, but, as this brings on another manifestation of pain, immobility under the infliction is soon acquired. Other patients experience, while at rest, or even with moderately slow movements, rather a sense of uneasiness than of actual pain; they may even bear the sitting posture with tolerable ease, if actual pressure on the affected part be avoided, and walk short distances with little or no discomfort; but all actions having to do with the outlet of the pelvis—defecation, the passage of flatus, sometimes, though more rarely, even micturition—cause great suffering. In three of my cases the patient was, on rising, fairly comfortable till obliged to visit the closet; this brought on severe pain, which continued all day to be again calmed by a night's repose. In another class of cases, the above actions cause no, or very slight, discomfort, but the patient sits uneasily, even if provided with an annular air-cushion; lying on the back is disliked, one side or the other is chosen. To turn on the couch or to rise from the chair, especially the latter, is very painful; walking very soon becomes so, as does also standing quite erect, so that not unfrequently a stoop from both hips and loins is acquired. In some such cases the pain will extend after a time up the sacrum to the loins, but in neither place does it become very acute.

It is partly on the history of origin, partly on a study of the conditions producing pain, that the first sketch-map of a differential diagnosis must be founded. It is believed that the above indications sufficiently clearly indicate that, putting aside mere neuralgia, we have to do with myalgia and spasm, which may affect the muscles running from the bone either forward or upward, the one set engaged with visceral, the other with locomotor functions. The surgeon must not, however, rest content here, but must make a careful examination, firstly external by placing his hand on the back of the sacrum, finger-tips pointing downwards. On exerting some pressure, he may elicit an expression of pain; but whether or not this be the case, he lets the hand glide down and the last joint of the middle finger pass into the upper end of the rima natium. Probably he feels the tip of the sacrum, rather perhaps very strongly, marked; passing the finger still downwards, he notes the position of the coccyx. If he have to do with a case of the first class, which I am now considering, he will find this directed very much forward, pressure causing pain. He must thereupon examine per rectum; in these cases, the sphincter is nearly always found very tight, and its slight dilatation, even by a small finger, is very painful. Just within this, the tip of the coccyx may often be felt, projecting straight forward and bulging the posterior wall of the bowel. A little further two rope-like projections are felt on the side-wall, which converge towards the back and even, in severe cases, appear to encroach a little on the lumen of the cavity, reminding one by their shape of the opening of the larynx between the vocal cords, though infinitely larger, of course. These projections, constituted by the edges of the contracted levator ani, are

One of the childish cases was the result of a fall, in a sitting posture, on a lump in the grass, out of a tree that she was climbing. Complete rest for nearly 3 weeks, considerable quietude for another month, and counter-irritation sufficed to cure.

This was in two cases so severe, that I was obliged to resort to anaesthesia, in order to make a sufficient examination.

tender on pressure, which not unfrequently causes a spasm. Pressing backwards the protruding tip of the prostate also causes considerable pain and spasm.

The above is the symptomatology of a form of this affection that I should like to call *perineal coccydynia*, in distinction to the cases which affect the parts posterior to the bone, and in which, when pure, none of the conditions mentioned can be made out by rectal examination, but in which movements of the lower limbs, rising from a seat, stooping, and standing erect again are productive of the prominent symptoms. It must, however, be noted that when the disease, though it begin pure, has lasted for some time, symptoms of the other class generally get mixed in, yet the initial trouble can, as a rule, be verified.

Treatment.—Experience has confirmed the views expressed by Sir J. Simpson and Dr. Nott, that, in the majority of these cases, medicinal treatment by tonics or analgesics fails to procure more than temporary relief, and that operation is our only resource. The account above given of different sorts of cases shows, however, that some discrimination as to the choice of method is necessary. Sir J. Simpson passed a tenotomy knife between the bone and the skin, and divided most of the structures attached to the former. This method, for many reasons, I consider faulty, at least in the greater number of cases.

The following is my method in the cases to which I have given the name "*perineal*." The patient, anaesthetised, is placed in the lithotomy position; the surgeon, seated, passes the left index into the rectum, having the thumb available for placing on the back of the bone, thus grasping it and having it quite in his power. He then passes a sufficiently strong, but not too large, tenotome through the skin behind the anus and a little anterior to the tip of the coccyx. His left index feels the instrument pass between the mucous lining of the bowel and the front of the bone; turning the edge backward, he divides, first from one, and then from the other, edge of the coccyx, the levator ani and the coccygeus muscles. Then, drawing the blade somewhat back, and turning the handle towards the left tuber ischii, the sphincter is separated from the tip of the bone; after this it is well to ascertain if the coccyx is quite free, to press it back, and to feel if, while doing so, any bands become tightened. This suffices, if the case be recent and purely perineal.

In the other class of cases, our attention must be directed chiefly to the glutei, and also to the lowest fibres of the lumbar fascia, which are, if not always, certainly in the great majority of subjects, prolonged downward and attached to the coccyx. In such cases, when pure, the tenotome need not skirt so closely the mucous membrane of the bowel, but should pass along both edges of the coccyx and, with the edge turned back guided by the left thumb, the glutei very thoroughly divided. The instrument being then withdrawn and introduced horizontally a little above the tip of the sacrum, all the soft parts are divided transversely from the deep surface of the skin down to the bone, the subcutaneous wound being $2\frac{1}{2}$ to 3 inches long.

In mixed cases—and those that have been allowed to go on for some time generally are mixed—both these operations are to be performed. I attribute failure in many reported cases to neglect of that last described cross incision—a point which I have not seen mentioned by any writer—and to operating upon cases that are purely neuralgic, that is to say, that have not the characteristic tension of perineal muscles, nor the clear evidence of pain being produced by certain definite acts, as above described.

Of the 23 cases in my table, 2 were purely neuralgic, 3 declined operation and withdrew from treatment. I operated on 17; of these one—the disease originated in an ulcer of the rectum—is perfectly well everywhere but in her home, which is not a happy one. The other 16 quite recovered of the coccydynia; but as the record extends over many years, some have since succumbed to age and some to various diseases.

Reports of Societies.

PARIS.

CHIRURGICAL SOCIETY.

Wednesday, March 21st, 1894.

Trephining in Gunshot Fractures of the Cranium.

Dr. Berger.—In the present discussion on the treatment of perforating gunshot wounds of the cranium (*The Medical Week*, 1894, pp. 104, 129, 140) there seems to me to be some misunderstanding between the partisans of immediate interference, as applicable to all cases, and those who do not recognise the invariable necessity of operating at once. The various opinions expressed are, indeed, to be considered only as theoretical doctrines, whereas, when it comes to their practical application, surgeons all over the world act pretty much in the same way.