which I had the privilege of seeing in the London Hospital. Sometimes both upper limbs with adjacent portions of the thorax in the form of a "vest" are affected, but it is distinctly exceptional to have the sensory disturbance generalised over the whole body, though such cases have been reported.⁹

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THE DIAGNOSIS DURING LIFE OF RETINAL AND LABYRINTHINE HÆMORRHAGES IN A CASE OF SPLENIC LEUKÆMIA.

By JAMES FINLAYSON, M.D.,

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A CASE of leukæmia which was studied in the Western Infirmary some ten years ago has not yet been reported, but certain points in the diagnosis made me resolve to publish it some time.

The patient was a married woman, aged 29, with five children; she was affected with splenic leukæmia, the spleen being enormously enlarged, without any glandular affections recognisable during life. Her fifth child was born in January, 1887, and her attention was directed to a lump in her left side three months later. In August, 1887, she was admitted to the Glasgow Royal Infirmary, where the lump referred to was identified as a large spleen, and the blood was found to be highly leukæmic—nearly one white to three red corpuscles. No hæmorrhages were found in the retina at that time. After trying a change to her native place—Islay—she was admitted to the Glasgow Western Infirmary on June 14th, 1889. The condition of the spleen was much the same as reported in the Royal Infirmary notes, but it was apparently larger, and the strength and condition generally had deteriorated; slight œdema of the feet was present on admission, but it passed off with rest in bed. The blood showed in 1889 very much the same proportion of red to white corpuscles as in 1887; we found 1,190,000 white and 2,080,000 red corpuscles in the cubic millimetre. This was shortly before death. The white corpuscles were mostly of the ordinary size, but about one-fourth of them were larger and more granular, with fatty contents. In 1887 the Royal Infirmary notes indicated the same diversity in size of the white corpuscles.

A month before admission to the Western Infirmary vomiting was troublesome for three weeks, but she seemed to have had no bleedings from the stomach or bowels (except slightly from piles when the bowels were costive), and no epistaxis.

After admission to the Western Infirmary the œdema disappeared, but the bowels became very loose, and this resisted treatment. A small swelling at the left frontal region suppurated and burst; this became erysipelatous, and the redness spread. This was associated with only slight pyrexia (100° to 100.4° F.), but it hastened her death, which occurred on July 19th, 1889, fully a month after admission.

The greatest point of interest was the implication of the eyes and the internal ears in a case of leukæmia; the possibility of recognising this during life, as due to hæmorrhages, was a matter of diagnostic interest.

About a month before admission to the Western Infirmary, whilst crossing from Islay in the steamer, she was supposed to have contracted "a cold," and to this she ascribed the deafness and ringing sounds in her ears from which she suffered, as well as the bloodshot appearance in her left eye. While on the steamer she was affected with severe giddiness, when the noises in the ears came on, and she felt sick, although the sea was quite calm at the time. As already stated, there had been an attack of vomiting a week or two before this.

An examination of the left eye showed at once that the blood-shot appearance ascribed to cold was really a conjunctival ecchymosis, and this immediately suggested the probability of hæmorrhages in the fundus; these were readily found

on ophthalmoscopic examination. This discovery in its turn suggested the possibility of hæmorrhages being present in the nervous structures of the internal ear on both sides. The sudden deafness, the noises in the ear, the giddiness, and sickness, all pointed in the direction of a labyrinthine affection. An exploration of the ears was made by Dr. Thomas Barr. Nothing abnormal was found in the external or middle ear, and the Eustachian tubes were easily inflated, but no improvement in the hearing resulted. A watch could not be heard on contact on either side, and the voice was heard only when loudly spoken near to the ears. The tuning-fork was heard longer by air conduction than by bone conduction. The conclusion of Dr. Barr's report on June 17th was: "The suddenness of the onset, the extent of the deafness, the presence of giddiness, and disturbance of head balance at the beginning, as well as the severe tinnitus, point to exudation in the cavities of labyrinth, probably hæmorrhagic in character."

At the examination of the body after death, the eyeballs were removed for examination by Dr. Thomas Reid, and the bones containing the internal structures of the ear were carefully dissected by Dr. Barr. The sections made of the retina displayed the hæmorrhages beautifully, and a microphotograph showed a striking abundance of leucocytes in the blood vessels. The examination of the internal ear showed hæmorrhages in the vestibule and the first turn of the cochlea, not at all in the middle ear.

Amongst other features of interest in the *post-mortem* examination may be mentioned the size of the spleen, 14 by 8 inches, and the weight, 6 lbs. 4½ ozs. It presented on section large, yellowish, firm patches of wedge-like shape, suggestive of infarctions, but on microscopic examination no indication was found of this having actually occurred. Some general enlargement of the mesenteric and retroperitoneal lymphatic glands was noted, and similar glands were seen in the neck. The omentum presented numerous, small, pearly nodules. Minute submucous hæmorrhages were seen in the colon with some injection of the vessels. The brain presented nothing specially abnormal, but the veins showed a considerable amount of greenish yellow clot. The heart contained greenish, opaque, fibrinous material, with a grumous fluid residue.

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As regards the literature of the subject, the most important contribution is by Gradenigo, in 1886, who gives a summary of the cases up till that date. A case by Steinbruegge, in 1887, presents some resemblance to my case, inasmuch as both the eyes and the ears were affected. From the reports of cases it would seem that in leukæmia there may be hæmorrhagic lesions both in the middle and inner ear, and that these may coexist with hæmorrhage elsewhere. (Something of the same kind has been observed in pernicious anemia. See *Archiv für Ohrenheilkunde*, Bd. 31, S. 231.)—Politzer, A. Pathologisch-anatomische Veränderungen im Labyrinth bei leukämischer Taubheit. Congress in Basel, September, 1884. *Archiv für Ohrenheilkunde*, Bd. xxii, S. 109.—Blau, L. Ueber Erkrankungen des Gehörorgans bei Leukämie. *Zeitschr. f. klin. Med.* Bd. x, Heft 1 und 2. Abstracted in *Archiv für Ohrenheilkunde*. 1886. Bd. xxiii, S. 169, and in *Archives of Otolaryngology*, vol. xv, p. 265.—Gradenigo, G., jun. Das Gehörorgan bei der Leukämie (with plates). *Archiv für Ohrenheilkunde*. 1886. Bd. xxiii, S. 242.—Steinbruegge, H. Labyrinthine Disease in a case of Leukæmia. *Archives of Otolaryngology*. 1888. Vol. xvii, p. 59. *Zeitschrift f. Otolaryngologie*. Bd. xvi, S. 238. See *Archiv für Ohrenheilkunde*. Bd. xxiv, S. 209. 1887.—Gellé. Leukocythämie mit Taubheit und Facialislähmung beginnend. (*Revue Mens. de Laryng.* 1887. No. 12). See *Archiv für Ohrenheilkunde*. Bd. xxvi, S. 253.—Steinbruegge, H. Communication to International Congress in Berlin. August, 1890. Case of leukæmia in a girl of 14 years, with hæmorrhages in the middle ear and in labyrinth. *Archiv für Ohrenheilkunde*. Bd. xxxi, S. 231.—Wagenhäuser. Labyrinth befand eines Falles von Taubheit bei Leukämie. *Archiv für Ohrenheilkunde*, 1892. Bd. xxxiv, S. 219.

THE ARTHROPATHIC DYSTROPHIES.

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DEFINITION OF TERMS.

It is a well-known fact that injuries of joints, often by no means of a severe character, leave behind them weakness which not uncommonly lasts for the rest of the sufferer's life. In some cases the weakness and atrophy of the limbs is so marked that special attention has been paid to them, and they were named cases of arthropathic amyotrophy (Charcot).¹

This name, however, is too limited, for changes occur in

other tissues. The skin and epidermic structures,² the connective tissues,^(2, 3) the bones,⁴ and even the vessels,⁵ and nerves^(6, 7), may severally or collectively be affected, and so, though the muscular atrophy is in many cases the most pronounced change, the broader and more comprehensive word *dystrophy* appears to me to describe these cases better than the more exactly limited word *amyotrophy*.

The arthropathic dystrophies, then, may be defined as those changes in the nutrition of any of the tissues of a limb which follow disease or injury of a joint, not being the direct result of this latter, and whether it be acute or chronic.

This definition excludes all changes that may be produced locally by suppuration in and around joints, or by the pressure of the effusion into the joint, or by pressure of a displaced bone on a nerve trunk or other tissues. It also excludes the changes in the ligaments, such as shortening or lengthening, which result from the disease or defective treatment.

Similar changes occur after injuries of limbs, such as fractures of bones or burns and lacerations of the skin.⁸ They may then be considered as a special subdivision of the reflex dystrophies (generally termed reflex muscular atrophies).

ETIOLOGY.

Sex appears to have little or no influence in favouring the occurrence of these troubles. Age is, however, of great importance; disease of the hip-joint, for example, in a child will interfere with the development of its limb to a remarkable extent. Nélaton,⁴ in 1835, noticed that such cases suffered even in the growth of the bones. An acute arthritis produced experimentally in a young animal will cause complete paralysis, lasting for days, and in that time serious changes occur in the bones and muscles.

In man one of the most important, if not the most important, factors in producing these dystrophies is the neurotic diathesis,⁹ and in patients of this description the changes may occur with the rapidity with which they do in the lower animals.

The rheumatic diathesis, which, practically speaking, we must consider really does exist, certainly favours their occurrence^(9, 3). Another very important point is the character of the arthritis—for example, whether it is septic or aseptic: septic, gonorrhoeal, acute rheumatismal, tuberculous joints, *et hoc genus omne*, produce disturbance of nutrition of a more severe character than do simple arthritis or luxations.

Opinions differ greatly as to the general liability to suffer from these lesions, some authorities¹⁰ saying that they occur in every case, while other consider them the exception rather than the rule.¹¹ It may be taken as a good working principle that dystrophy occurs in one or more tissues of a limb in all arthropathies, though to a greatly varying extent.

SYMPTOMATOLOGY.

In a traumatic arthritis, at the moment of injury, a sudden impotence of the limb is experienced in many cases;¹² it may be transient or last some time, only diminishing with the arthritis and gradually giving way to the paralysis due to muscular atrophy: cases of this kind are rare according to Gowers,¹⁰ but Raymond¹³ states that he has produced such experimentally with great uniformity. A minor form of it must be in the remembrance of many; personally, a sharp blow on an exposed cartilaginous surface, as in accidentally striking the elbow or knee, when in certain positions, against projecting parts of furniture, is immediately followed by a passing sensation of helplessness quite independent of the sensation of pain.

The inflammation of the joint proceeds and the changes may set in either with great rapidity or slowly; in the first cases the muscles may lose one-third of their bulk in a week; in the slower cases, associated with the muscular change may be thickening or wasting of the skin; fat and aponeuroses may hypertrophy or atrophy, the hairs show increased or diminished growth, there is increased or diminished exudation from the skin, the local temperature may rise but generally falls (the temperature is of course higher in immediate proximity to the joint).

The nervous system gives evidence that the changes may even extend to it; the reflexes increase, muscular twitchings are seen, and tapping the muscles calls forth exaggerated fibrillary contractions; anaesthesia or hyperaesthesia may be

found^(14, 13, 3), either in patches or extending over the whole limb; hyperaesthesia or neuralgia with painful spots may occur; thus, in a traumatic arthritis of the knee, I have seen severe pain and hyperaesthesia occur over the skin of the calf. These subjective nervous symptoms may be referred to the opposite limb. Spasm of the muscles is well known and recognised by surgeons.¹⁵ Slow systematic movements, athetotic in type, are seen rarely.

The electrical reactions in a well marked case are as follows:¹⁶ The faradic excitability is often diminished but generally exaggerated; there is no increase in the answer to the galvanic current, and the reactions to the different poles remain normal.

The typical reaction of degeneration very rarely occurs and then usually in cases of osteo-arthritis; it always indicates organic disease of the nerve cell (Charcot).¹⁶ The static electrical discharge produces an exaggerated muscular contraction (Charcot).

The changes in the tissues are far from being localised around the joint; thus arthritis in the ankle may produce severe atrophy of the muscles of the buttock. The extensor muscles are credited with suffering most acutely^(10, 13), but from some carefully analysed experiments (to be detailed elsewhere) that I have made this view appears to be incorrect. The bones become more fragile and are readily broken.

The muscles, being the true ligaments of the joints, are apt in their weakened condition to permit strains of the ligaments and capsule, re-exciting inflammation which in its turn further weakens the muscles and so completes the vicious circle; this is often seen resulting from sprains of the ankle-joint.

PATHOLOGY.

It is not my intention here to discuss the pathology of these conditions at full length; much disputation has occurred over it, but now there are few who deny that they are produced reflexly through the nervous system. Raymond⁽¹³⁾ showed that if the posterior nerve roots of the lumbar region of the dog were divided on one side, and if then an arthritis was produced in each knee-joint, the muscles atrophied only on the side on which the nerve roots were *not* divided. Korniloff⁽¹⁷⁾ disputed this, but Hoffa⁽¹⁸⁾ has again repeated the experiments and confirmed Raymond's results. The conclusion drawn, therefore, is that interruption of the afferent part of the reflex arc prevents irritation of the centre, and so prevents damage to the nutrition of its dependent parts.

The importance of the influence of rest is now much discounted. The patient with a diseased hip lies on his back in bed, with both limbs otherwise in exactly similar conditions; the one leg wastes markedly, the other but slightly, or not at all. The animal whose knee has been inflamed carries the limb high off the ground; here is no rest, but the contrary, as the muscles are all tonically contracted, but still the limb wastes with great rapidity.

DIAGNOSIS.

In the majority of cases this is very simple, but unless these conditions are borne in mind it is easily overlooked. Dr. G. V. Poore has pointed out that many so-called trade spasms may be associated with chronic changes in one or other joints of the involved limb. For instance, in writer's cramp the shoulder may be affected with chronic rheumatism, treatment applied to the symptom being of no value unless the primary lesion is also attacked.

If the muscular atrophy comes on with great rapidity, or if epidermic and neuralgic symptoms are specially prominent, confusion with nervous disease of a different character may readily occur; but in such cases the electrical reactions usually show a greater departure from the normal. In cases of traumatism, lesions of the nerve trunks may be excluded by the electrical reactions and by the distribution of the motor and sensory disturbance; in general, a lesion of a nerve trunk gives rise to more severe paralysis than occurs in the cases of which we are speaking.

In many, especially chronic cases—and these are the ones most frequently seen—measurements will reveal no loss in size of the limb, the fatty and connective tissues having apparently replaced the muscles. The diagnosis in these cases must be made by the history, or the presence of disease still persisting in the affected joint, together with the flabby and

toneless state of the muscles. These are the cases so frequently described as weak joints, stretched or yielding ligaments, etc.

PROGNOSIS.

In cases in which distinct changes are visible in a few days, the prognosis is bad, though careful treatment may check the disease to some extent. When the primary disease has been cured, sometimes improvement may be effected to a limited extent. When the joint disease persists, good results may be expected from treatment, if it is curable; but where the joint disease is incurable, no improvement can be expected, though the downward progress of the tissues may be retarded or even temporarily arrested.

TREATMENT.

In every case of joint disease or injury the certainty¹⁰ of dystrophic changes following to a greater or less extent must be remembered. In acute disease or trauma of a joint there is no special indication for treatment apart from that suitable for the joint itself. The more frequent practice of aspiration may be recommended; properly carried out it is devoid of risk, and there is no doubt that tension of the joint capsule increases the tendency to these changes, and so must be relieved by the best means at hand. After a few days careful comparisons of the two limbs should be made; if atrophy is found massage should be at once employed, and passive movements as soon as possible. At a later stage, if there is not too much irritability, the faradic current must be employed, and in the cases where the reaction to this is feeble, sparking from a friction machine is recommended by Charcot.

In chronic cases, massage, douches, electricity must all be tried, and where there is no joint disease persisting systematic exercises may also be employed with great advantage. Where joint inflammation persists, as it often will do to a very slight degree, the question arises of its causation, and often it can be shown to arise from the feeble manner in which shocks and strains are warded off by the muscles. In such cases rest and fixation, together with the means already advocated for improving the muscular nutrition, will do much good. When the inflammation is rheumatic in origin the treatment must be constitutional as well. Nervous irritability is often present, and will be improved by tonics rather than by sedatives.

The dystrophic condition of the skin and other structures usually does not call for special treatment; if, however, pains of a neuralgic type are present analgesics may be given with caution.

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MEMORANDA:

MEDICAL, SURGICAL, OBSTETRICAL, THERAPEUTICAL, PATHOLOGICAL, ETC.

PECULIAR RESPIRATORY DISORDER PRODUCED BY THE HABITUAL USE OF STRYCHNINE.

In October, 1897, I was consulted by W., a medical man, aged 31, for certain symptoms due, he said, to the taking of strychnine two years previously. He had then been taking as a tonic liquor strychnine hydrochlor. 5 to 10 minims thrice daily, with a little sal volatile. He was at first benefited, but

afterwards experienced a desire to take abnormally deep inspirations, and he felt that to do so would overcome the inhibitory power over the lung, probably the action of the diaphragm. One morning, after a dose of strychnine, he did take such an inspiration, and from that moment he experienced the sensations complained of. They were, briefly, inability to take deep inspiration, a fixation of the chest walls compelling him to stoop, weakness on exertion, great confusion of thought and memory, occasional clay-coloured fæces, usually greater in amount than ordinary. After six months the apex beat descended to the sixth interspace, and headache and drowsiness became marked.

Acting on medical advice he travelled for six months, but was little benefited. All attempts then and subsequently to act on the heart with drugs increased the headache.

In October, 1897, I examined him, and found the heart dilated slightly. There was a wide subcostal angle, with marked epigastric pulsation. The chest moved *en masse*, and was hyper-resonant. There was slight bulging in the hepatic region. The patient had a very anxious expression. He said his life was a burden from headache and confusion of thought occasioned by trying to think coherently on his cases. He said he felt as if his chest, especially in the hepatic region, was too full, as if his lungs were distended, but that any attempt to empty them only increased the headache and mental confusion, and was followed by pale stools next morning. He had lost a stone in weight.

I tried a great variety of drugs to act upon his liver, but with little benefit. Most relief was obtained from an ordinary pill of aloes, nux. vomica, and belladonna with a couple of quinine lozenges. Without the lozenges there was no benefit. For the headache, antipyrin did temporary good. Bromides were of no avail. For the emphysema, so-called by the patient himself, senega, belladonna, and potassium iodide in small doses gave slight relief. Galvanism over the diaphragm did no good.

The patient in spite of treatment got gradually worse, became very melancholic, and so drowsy that he would sleep in his chair whenever left alone for five minutes.

In October, 1898, chiefly by way of experiment, I prescribed tincture of hyoscyamus 20 minims at night. The effect was strikingly beneficial. After a single dose, the drowsiness ceased entirely, and has never tended to recur except on severe exertion. The headache and mental confusion were much improved. The lower ribs approximated, and the patient could empty and fill the lungs more easily. The apex beat, except on deep inspiration, returned to the fifth interspace. The patient has continued steadily to improve.

I consider that in this case some amount of emphysema was produced directly by the strychnine, but that there was in addition an over-action of the inhibitory centre of respiration producing what might be called a general brain strain. The case is interesting as illustrating (1) a rare condition produced by strychnine and a serious danger in its use, without any premonitory muscular twitchings; (2) the excellent effects of hyoscyamus in such a case after persistence of symptoms for three years.

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PARADOXICAL PYREXIA.

AFTER the discussion at the meeting of the Clinical Society on November 11th, and the note on the subject in the *BRITISH MEDICAL JOURNAL*, the following case may be of interest. The temperatures were on each occasion taken by myself, and I can guarantee that they are correct. There were no poultices, no hot bottles, nor anything up the sleeve; in fact, "no deception" of any kind:

Mrs. A., aged 35, was recovering from a very mild attack of influenza, when one day at my evening visit I found to my great surprise that her temperature in the armpit was 104° F., and on taking it again shortly afterwards it was 106° F. She said she did not feel uncomfortable, nor particularly hot. I gave a dose of phenacetin, but in half an hour the temperature was 107° F. As I was at first afraid that the hyperpyrexia might be a dangerous complication of the influenza, I asked for a second opinion, but when the temperature in another half-hour was 108°, with a pulse of 100 and little or no discomfort, I was relieved at the thought, that