No atrophy of the growth occurred, but the vagina became much more lax, so that she could be examined more easily. She lived six months, and might well have done so without operation. She had some severe losses, and died after a very severe one.

Dr. Beatson has recently stated that in four cases of cancer of the uterus the only result obtained was diminution of sloughing and of bleeding. I believe that the operation has been tried for cancer of still other parts, with which one would suppose the ovaries to be less closely associated, but I do not know the results. In the *BRITISH MEDICAL JOURNAL* of June 17th Professor Hobday states from an experience of three cases that oöphorectomy seems to check the growth of a certain very obstinate papilloma of the vagina in bitches.

Another idea which suggests itself is that castration in the male should have similar effects. It may have, but the inference does not seem to me to be at all certain, for although developed from corresponding bits of embryonic tissue, nothing can be clearer than that the ovary and testis differ in most respects. The experiment, however, has been tried, and we must await the publication of the result.

By-and-by I hope to complete the notes of my cases. Although I cannot as yet, like Dr. Beatson, bring forward a case of apparent "cure," I do claim that in both my cases, Nos. 1 and 2, suffering has been alleviated and life prolonged. I should say that, but for the improvement which followed upon the oöphorectomy, No. 2 would now have been either in her grave or very near it. The cases I have narrated open up, as you have seen, numerous problems and a wide field for clinical work in connection with a disease so common that all have opportunities, and so distressing that all must long for some better means of dealing with it; and it is in the hope of drawing further attention to Dr. Beatson's suggestion, and of stimulating observation, that I publish these preliminary notes.

REMARKS ON FRIEDREICH'S ATAXIA, WITH NOTES OF THREE CASES.*

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THE following account of this rare disease is principally taken from the records of three typical examples of the affection, which I had the opportunity of watching for eight or nine years.

The disease gets the name Friedreich's disease or Friedreich's ataxia from having been first described by him in 1861. He thought it was a form of locomotor ataxia, and subsequently suggested that the disease was due to defective development of the spinal cord. This opinion is strongly supported by Déjerine and Letulle, and recently the *post-mortem* examination of the nervous system made by Dr. Byrom Bramwell on one of the cases I am about to describe, fully bears out this opinion. The disease has also been called the "hereditary form of locomotor ataxia" and "hereditary ataxia," but these names are objectionable, as the disease is not related to locomotor ataxia, nor is it truly an hereditary affection transmitted from parent to child, but rather a "family disease," occurring in several members of the same family, whose parents are quite healthy. Dr. Griffith, in the *International Journal of the Medical Sciences* for October, 1888, proposed the name Friedreich's ataxia rather than Friedreich's disease, and this is the name subsequent authorities have adopted. Friedreich's ataxia bears most resemblance to locomotor ataxia, cerebro-spinal sclerosis, and ataxic paraplegia. But it is essentially different from all of them, as will be seen from the following description. The cases the history of which I am about to relate are members of the same family.

The eldest, Mr. B. B., was aged 24 at the time of his death, which took place last December from acute rheumatic fever and endocarditis. He was of decidedly blonde type of complexion, and very intelligent, occupying himself diligently in the study of music. He presented all the characteristic features of the disease. As an infant he was quite healthy.

* Read before the Gloucestershire Branch of the British Medical Association.

When a small child he frequently used to have attacks of uncontrollable crying and laughing, which often produced a spasm of the larynx, causing him to become quite black in the face, and on more than one occasion quite unconscious, seeming to his mother apparently dead. The attack would end by a gulping sound in the throat, after which he gradually regained his breath.

The first indications of his complaint were a "turning in of the right foot" and pains in the legs. These were noticed when he was aged 6½ years. He was at that time a robust, well-developed child, but extremely nervous, especially of carts or passing objects. He also suffered from occasional nocturnal incontinence of urine and fæces, and attacks of diarrhoea. The latter were brought on by any nervous excitement, and were considered by his then medical attendant to be due to his nervous temperament, and not to any gastrointestinal irritation. The pains which developed at the time appear to have been true lightning pains, but were never very severe, and were chiefly confined to the legs. At the age of 7½ years it was noticed his legs used to shake inordinately, and his gait was staggering. At this time also arching of the foot was first observed. At the age of 8 years he went to school, his general health being good, but his gait was worse, and he was subject to uncontrollable fits of laughter. At 12 years of age he was head of a school of fifty boys, many of whom were 15 years old. At the age of 13 he was placed under a medical rubber in London. His mother states that the rubbing, which was continued for several months, did him a great deal of harm, and it was, she thinks, the cause of peculiar nervous (hysterical or epileptic) attacks, which at this time he suffered from. These attacks usually came on in the morning before the patient was awake. He seemed as if he was mesmerised or hypnotised. During the attack he would go through his former school life, get out of bed, fight with imaginary boys, repeat his lessons, and recount his school experiences. During several attacks he thought he was a general, gave orders to his officers, imagined he was wounded in the back, and the bullet had lodged in the thigh, pointing out the exact spot.

Exactly the same story was repeated during several consecutive attacks, and he used to describe minutely his favourite nurse, and order her to be sent for. He could not remember her while awake. These attacks would last from one to several hours, after which he would get into bed and fall asleep. On awaking he was quite well, and remembered nothing of what had happened. The attacks occurred every two or three weeks during the seven months while he was being rubbed, after which they ceased. At the age of 19½ years he had a well-marked epileptic fit from no accountable cause. Since that time he has repeatedly been subject to epileptic attacks, and has had to be kept constantly under the influence of bromides. The family history, which of course applies to his younger brother and sister, is interesting in some respects, pointing to the etiology of the disease.

The father, who was very blonde, was delicate in early life, and got very stout between 20 and 30 years of age. As a young man he lived fast, but it is not definitely known that he ever had syphilis. The children do not manifest any signs of inherited syphilis. During his married life he was much given to rich living, and habitually consumed large quantities of wines and spirits, but without getting actually intoxicated. He suffered much from rheumatic gout, and died at the age of 40 from cancer of the stomach and liver. His relatives are rheumatic and gouty, but none of them manifest any nervous diseases.

The mother is alive and well, of nervo-sanguineous temperament, and very excitable but not hysterical. During the time she was bearing children her life was one of continual social excitement and high living, and she used to keep herself going by the continual use of stimulants. Her relatives are of a decidedly nervous type; one aunt suffered from epilepsy, a brother was drowned while rowing, it being supposed that he took a fit and fell into the water. One of her cousins is notably intemperate. There have been no cases of Friedreich's ataxia or locomotor ataxia on either side of the family. It is quite possible that the children were conceived when the parents were decidedly under the influence of alcohol.

There were six children. One died in infancy; and of the

five remaining three were affected with the disease, two of whom have recently died. The eldest of the family, a daughter, is quite healthy, married, and has three young children. The second, a daughter, is now 27 years of age, myopic, delicate, and of a neurotic character. Her knee-jerks are exaggerated, and she presents no symptoms of Friedreich's ataxia. The third, a son, died at the age of 24 years, and presented all the characteristic features of the disease. The fourth, a girl, died at the age of 19, and first showed symptoms of this disease at the age of $5\frac{1}{2}$ years. The fifth, a son, aged 19, developed the disease at the age of $6\frac{1}{2}$ years, and is now a very marked case.

The condition of the eldest son previous to the attack of rheumatic fever from which he died was as follows. He was 5 feet 7 inches in height, and weighed $9\frac{1}{2}$ stone. He was very thin, and had an anxious, careworn expression, and was, as previously mentioned, of very fair complexion. He was unable to walk, and could barely drag his legs after him when supported by both arms. In 1888, when at the age of 16 years, he could walk long distances, and was out of doors all day. Four years ago his gait was very characteristic; he staggered and tumbled about, and would have fallen if not supported. With slight assistance he could manage to get along. On attempting to walk his body and head were bent forward, and his eyes fixed on the ground; the arms were extended forwards or laterally, as if in search of some support or as a means of balancing the body. Walking was attended by great effort and fatigue. At each step the hindmost leg was brought forward round its fellow with an awkward, inco-ordinate swing or jerk, the foot planted flat on the ground, with the toes turned inwards. The whole body oscillated, and the patient reeled from side to side.

The movements of the upper extremities were not affected until the patient was 11 years of age. At the age of 16 there was marked ataxia. Writing was almost impossible for the last two years of his life. Feeding was a great difficulty owing to the jerky inco-ordinate movements of the arms. When he attempted to pick up or grasp anything the hand was first spread out like a claw over the object and then closed on it.

Muscular power in both upper and lower extremities was good, and the muscles were as well developed as could be expected considering his enforced sedentary life. Painful cramps were present in the calves of the legs, especially at night. The tonicity of the muscles was good. The muscular contractility to both forms of electricity was markedly increased. The increase was a simple one, the order of polar reactions being quite normal. The weakest currents caused severe contractions, and brought on great emotional disturbances—shouting, laughing, crying, etc. The knee-jerks were completely absent. The other reflexes were exaggerated. Choreic-like movements were very marked in the facial and limb muscles, on speaking or making any movement. These movements bear no resemblance to the rhythmical tremors of cerebro-spinal sclerosis. When the patient spoke, the head was jerked forwards, and the facial muscles twitched and acted inco-ordinately. The arms and legs also tended to move irregularly. Static ataxia and Rhombert's symptom, or inability to stand with the eyes closed, were marked. Vertigo was not complained of.

The muscular sense appeared to be unimpaired. The sensibility of the skin to all forms of stimuli (tactile, heat, cold, and pain) was markedly exaggerated. Painful stimulation of any part of the skin produced faintness. Rubbing or tickling the skin produced great mental excitement. This may account for the injurious effect on the mind of the massage treatment already mentioned. Lightning pains were felt during the first years of his illness, and appear after careful inquiry to have been of a true ataxic character. They have been absent for some years past. The special senses of sight, hearing, taste, etc., were perfectly normal.

Speech was markedly affected. The articulation was jerky, moderately rapid, and apt to be interrupted by sudden pauses which often occurred between the syllables, owing to muscular inco-ordination, and the lips and facial muscles contracted inco-ordinately, producing contortions and grimaces.

There was no tremor of the tongue, no difficulty in retaining the saliva in the mouth, and no difficulty in swallowing,

but, sometimes, from inco-ordinate muscular action, particles of food would get into the upper part of the larynx, and cause violent choking attacks.

There was slight nystagmus, but this symptom was much less marked than in the other two cases. With the exception of the nystagmus, the ocular condition was perfectly normal. The pupils were usually dilated, but they reacted perfectly, both to the stimulus of light and during efforts of accommodation.

A well-marked spinal curvature was present. This condition is more marked in the patient's younger brother (Fig. 1). The feet were characteristically deformed, being

Fig. 1.

shortened from before backwards (clubbed). The insteps were arched and the dorsum very prominent, the toes dorsiflexed, and the balls of the toes, more especially the great toe were very prominent (Fig. 2). The feet were cold, and almost always of a blue or purple colour. With this exception there were no other vasomotor or trophic alterations. The bladder and rectal functions were normal. The intellectual faculties were unimpaired, the patient being very intelligent.

His general health had always been good, and, beyond the minor complaints consequent on a sedentary life and frequent headaches, he had had no serious illness until the attack of rheumatic fever which proved fatal.

With regard to treatment: Iodide of potassium, iodide of iron, arsenic, phosphorus, and various nervine tonics were systematically tried from time to time, but without an beneficial effect. During the eight years which I attended him the only remedies which had any influence on the symptoms peculiar to the disease were bromide of potassium and hydrobromic acid in combination. This relieved much of the painful cramps in his legs, and he stated he felt steadier and better in his movements while taking them.

At the age of 19 years, a prolonged trial was given to the suspension plan of treatment recommended by Charcot for

this disease and tabes. The patient thought that this treatment was beneficial, and made him feel steadier and stronger, but its appreciable effects to others were very doubtful. Two years ago a course of injections, first of orchitic fluid and subsequently of cerebrin, were tried, but neither of these produced any beneficial effect. The symptoms gradually and steadily progressed without any period of arrest or improvement since they first manifested themselves at the age of 6½ years until the time of his death at the age of 24, when he presented a marked clinical picture of the disease.

Fig. 2.

With regard to the two younger members of the family, they presented all the characteristic symptoms of the disease, which need not again be related; but the elder of the two, the daughter, C. B., who died three years ago, presented certain peculiarities, namely, during the earlier periods of her illness, from the age of 5½ years to the age of 13 years, characteristic lightning pains, so severe as to make her frequently cry out, were present. They were the first symptoms of the disease, and were felt in the legs, sometimes in the head. She also suffered from attacks of gastric pains and vomiting, which appear to have been true gastric crises. They occurred about once in six weeks, were ushered in by a feeling of sickness and sharp pains in the stomach, soon followed by sickness, and then violent retching about every quarter of an hour without any relation to food or liquid taken. These attacks usually lasted forty-eight hours, sometimes longer, causing great exhaustion, and were followed by pains in the arms, wrists, and legs. The occurrence of such marked attacks of gastric crises and lightning pains is altogether exceptional in cases of Friedreich's ataxia, no other cases presenting these symptoms having been recorded. Latterly, the patient also suffered from intense neuralgic headaches of a periodic nature. All modern remedies for headaches of various kinds proved of small avail, and, finally, hypnotism was resorted to, which proved most serviceable in relieving the patient's sufferings during the periodic exacerbations of pain. After being confined to bed for two years the patient gradually sank from general exhaustion, worn out by repeated attacks of gastric crises and persistent headache. At the *post-mortem* examination, which

will be more fully detailed later, distinct patches of meningeal inflammation and thickening were found in the cavities of the skull and spinal canal, which may account for the headaches.

With regard to the youngest boy, all the symptoms of the disease are presented in much more pronounced degree. The ataxia has been more exaggerated since the age of 10 years. The spinal curvature and foot deformity are more marked. The nystagmus is very evident and the speech much affected. His first symptoms of the disease were attacks of pain in the bowels and diarrhoea, coming on in quite an unaccountable manner. At the age of 8 years he suffered much from lightning pains, but these have now quite disappeared. At the present time (he is now 20 years of age) he is a complete invalid, quite unable to walk or stand, and suffers much from coldness and blisters on his feet, the result of vasomotor trophic disturbances.

The above record of the clinical pictures presented by these three cases of Friedreich's ataxia show that the disease is a distinct "clinical entity," differing markedly from locomotor ataxia, cerebro-spinal sclerosis, and ataxic paraplegia. The disease which most resembles Friedreich's ataxia is locomotor ataxia. In both the posterior columns of the cord are sclerosed, in both difficulty of walking due to inco-ordination and not to paralysis is the leading symptom, and in both the knee-jerks are abolished. These points of resemblance bring the two diseases into very close relationship, but the points of distinction are more marked, namely:

First. The general character of the symptoms and history of the diseases are widely different, as may be seen from the above account of Friedreich's ataxia.

Secondly. With regard to the morbid anatomy, the account of which is for the most part taken from Dr. Byrom Bramwell's report of the pathological state of the spinal cord in the second of the two cases above recorded.

In locomotor ataxia the cord is of normal size, and the sclerosis is confined to the posterior columns and sensory nerve roots. In Friedreich's ataxia the cord is distinctly smaller than normal, and this congenital defect involves also the medulla and pons Varolii. This was well marked in C. B.'s case. The sclerosis is more extensive than in locomotor ataxia, and involves the columns of Goll and Burdach, or posterior columns, the vesicular column of Clarke, the direct cerebellar tract, and the crossed pyramidal tract. Further, in some cases the posterior roots in the lower part of the cord have also been found affected. The extent of the lesion is well seen in the diagrams, Figs. 3, 4, 5, which are taken

Fig. 3.—Transverse section of spinal cord in cervical region. A. Anterior median fissure. B. Posterior median fissure. C. Column of Goll unstained from sclerosis. D. Fasciculus of Burdach, partly sclerosed.

from specimens of the cord in C. B.'s case, prepared by Dr. Byrom Bramwell.

In some cases a still further extension of the disease may be found, involving other parts, namely, Gowers's tract, the mixed ascending tract in the lateral column and the column of Turck, or direct pyramidal tract. There is also a thickening of the membranes surrounding the cord, and a certain

amount of meningo-myelitis, these changes being most marked in the lower parts of the cord.

[Fig. 4.—Section through the dorsal region. A. Anterior median fissure. B. Posterior median fissure. C. Column of Goll, much atrophied. Fasciculus of Burdach partly sclerosed. E. Antero-lateral column showing commencing sclerosis as yet limited to the crossed pyramidal and direct cerebellar tracts.

Fig. 5.—Section through the lumbar region. A. and B. Same as before. C. and D. Columns of Goll and Burdach, much atrophied. E. Sclerosis of lateral columns. G. Posterior roots, atrophied.

The lesion in Friedreich's ataxia is, therefore, a combined sclerosis of certain tracts in the posterior and lateral columns of the cord, together with the vesicular columns of Clarke in the grey matter and the posterior nerve roots.

Now, though in advanced cases, such an extensive development of the sclerosis may be met with, the primary lesion is a sclerosis of the posterior columns and vesicular column of Clarke, as has been proved by Déjerine and Letulle, who have also shown that all the other parts affected, namely, the direct cerebellar tract, the crossed pyramidal tract (?), Gowers's tract, the mixed ascending tract, the column of Turk, and the posterior nerve roots, are only involved in the later stages of the disease, and due to the meningo-myelitis, more marked in the lower part of the cord, and differing in the character of the sclerosis from that of the posterior columns.

According to Déjerine and Letulle the sclerosis of the posterior columns in Friedreich's ataxia is essentially different from that of locomotor ataxia, and, indeed, from every other sclerotic lesion. "It is a pure neuroglial sclerosis" (see Fig. 6). In it one sees fibres crossing one another in different directions, forming true whorls, and that the processes of the pia mater passing into the cord are perfectly normal. The whorls are composed of fine long fibres, running for the most part horizontally or obliquely at very acute angles, and in the midst of these whorls are seen some remaining nerve fibres, lying horizontally and obliquely, not cut trans-

versely, as is the case in all other sclerosis, where the degenerate nerve fibres are cut transversely, and the new development of fibrous tissue is in the course of the blood vessels or pia mater processes or nerve tubes. This proves the lesion to be associated with the earliest development of the cord, and not a lesion following on the fully developed cord.

Fig. 6.—Transverse section through the posterior columns at level of lumbar enlargement, after preparation by Dr. Byrom Bramwell. A. Posterior median fissure with blood vessel cut transversely. B. Whorls of fibres cut longitudinally. C. Fibres cut transversely.

It is only in the posterior columns of the cord that this particular form of sclerosis is met with. In the other parts affected, the sclerosis is the same as is found in other diseases, such as locomotor ataxia, cerebro-spinal sclerosis, etc.

It is still questionable whether the crossed pyramidal tracts are not primarily involved, as some of the earliest symptoms of the disease, such as the foot deformity, which is presumably due to the affection of the crossed pyramidal tract, seems to point to this part being primarily affected.

But for a full account of the disease and the points still unsettled, I would refer you to Dr. Byrom Bramwell's *Atlas of Clinical Medicine*, from which I have derived much of the above account of the pathology of the disease.

SERUMTHERAPY IN PUERPERAL SEPTICÆMIA.

WITH A TABLE OF CASES.

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As the number of recorded cases of puerperal septicæmia which have been treated with antistreptococcic serum is still small, it is highly desirable that all such cases should be published, in order that a true estimate of the value of this treatment may be made, and rules laid down for guidance as to the dose, time, and frequency of administration, and the selection of cases in which it will be of most benefit. To the following abstract of the notes of 3 cases in which I have used the antistreptococcic serum, I have appended a table of 23 cases so treated, collected from various publications, showing the date of onset of the malady, the date of the first injection, the number of injections, with the quantity injected and the result.

In no case can it be said with certainty that the treatment was followed by ill-effect which could directly be attributed to it. Gaulard thought that the fatal result of his second case was due to an overdose of serum, but as Dr. J. D. Williams¹ pointed out, this was most probably a mistaken view, and it may be seen from the table that in several cases more than twice the quantity Gaulard gave has been administered without harm. In fact, in Kennedy's case, the quantity given as the initial dose equalled the quantity given by Gaulard in four injections. In Dr. Williams's second case the patient