REMARKS UPON REGRESSIVE PARALYSIS :
CHIEFLY AS SEEN IN THE YOUNG SUBJECT (SO-CALLED INFANTILE PARALYSIS, ACUTE SPINAL PARALYSIS, ETC.).

By W. H. BARLOW, M.D.,

Consulting Physician to the Dispensary, General Hospital, and Dispensary for Sick Children, Manchester and Pendlebury.

THE term "acute spinal paralysis" is vague, and may include several distinct forms. If by this term be meant the disease hitherto described as "infantile paralysis", and characterised by destruction of the great ganglion-cells of the anterior cornua, which is now known to be common to the adult as well as the infant, and to which the above name was given by Heine, Séguin, and others, then it is inexact and insufficient. The title given by Kussmaul, "poliomyelitis anterior acutissima", though exact enough as a description of the lesion generally found, is scarcely satisfactory, inasmuch as it describes rather the result of the morbid action than its nature; and it is by no means certain, or even probable, that the inflammatory process is confined to the grey matter. In this state of uncertainty, I ventured in the year 1879 to suggest a name which should not be manifestly incorrect, and, while designating the disease in a clear and distinct manner, should yet express no theory of a pathological nature, which future research might show to be unfounded. That name was "regressive paralysis", being based upon the most marked and constant characteristic of this form of palsy, and standing in bold relief from the class of *progressive* paralyses; and this name I venture again to submit, as a general title, to the approval of my brethren. In the year mentioned, I published the details of over sixty cases of this disease occurring in the infant, and one in adult life. Since then, I have largely increased my experience, both in the child and among those of riper years.

Further experience has confirmed the belief that the disease is essentially the same, whatever be the age of the patient attacked. The mode of onset, the character of the accidents preceding the febrile and inflammatory symptoms, and, so far as our yet limited experience goes, the final pathological results, are all essentially the same, with only such differences as might have been expected *a priori*, from a consideration of the greater mobility and excitability of the nervous system, in the young child, during the processes of active growth and development.

A young man aged 18 was exposed to great heat, moisture, and sudden variations of temperature, while employed as an engine-fitter in repairing an engine in a building where another was in full action. After two days, he was seized with a rigor, followed by shivering, fever, pain in the back, and finally paralysis of both legs, which eventually made regression from all but certain muscles of the right leg.

Again, an officer aged 31, after exercise in a powerful sun, took in the evening a cold bath in the open sea; he felt chilly, but remained exposed to this influence for three-quarters of an hour. He had pain in the back, was restless, and finally was paralysed in both legs and muscles of the loins. Regression was made from the muscles of the back, and from some of those of the legs; the temperature of the limbs became lowered, and the skin mottled. Electrical exploration showed the reaction of degeneration.

Again, a man aged 34, apparently quite healthy, attended a crowded meeting, and, while perspiring profusely, walked home in a snow-storm, with a keen north wind blowing upon him; was chilled; had pain and stiffness in the back of the neck; was feverish, restless, and unable to sleep; and, after a day or two of these symptoms, had difficulty in passing urine, and was paralysed in all four extremities; and eventually there was regression from the right arm and hand, and some improvement in the other limbs. (The two latter cases are from Althaus.)

Or an agricultural labourer, after prolonged exposure to wet and cold for several days in succession, is seized with rigors, febrile reaction, pain in the back and limbs, followed by paralysis of both legs, which soon recedes from one and becomes definitive in the other limb.

The illustrations might be multiplied to an almost indefinite extent, all agreeing in the previous exposure to some severe peripheral shock, either by severe alternations of temperature or some similar cause, followed by an irritative fever with hyperæsthesia, to end in a definitive paralysis of smaller extent than ensued on the first manifestation, with atrophy of the paralysed muscles. In the earlier accounts of this affection, the fact of the regression was not accentuated, in some cases not noticed—a fact due to the advanced period at which most of them came under the observation of the reporters, and the consequent imperfections of the early history. The same causes have made some confusion, in the history of the cases reported in the early days, of the research into the nature and causes of the affection as seen in infants;

but these have been cleared up by the light of further inquiry, and the same is now occurring with regard to those in adult life.

The cases reported are not yet sufficiently numerous to enable us to say whether the seasons have any influence upon the adult form of this disease, but with regard to the infantile form the evidence is very clear. Of 111 cases in which a clear and distinct history of the attack and its date of onset were obtained, no fewer than 71 cases occurred in the four summer months, thus divided:—in June, there occurred 13 cases; in July, 26; in August, 22; in September, 10=71. This shows that almost one-half of these cases happened in the two hottest months of the year, July and August. This fact, which I published in 1879, was, I have since learnt, noticed by Dr. Wharton Sinkler of Philadelphia, and published by him in 1875; but I have not seen it noticed by European authors until recently by Onimus. In connection with these facts, it is interesting to note the ages of the patients attacked; of 149 cases, there were 15 under six months; between that and one year, 27; between the ages of one and two years, 52; between two years and five, 42; from five to seven, 3 cases; and in 10 no distinct account could be obtained. Thus it is just at that period when the nervous system of the child is most excitable, and when, from the processes of rapid growth and development, and from the evolution of the teeth, it is most susceptible to external influences, that these attacks occur. And just as, during these periods and during the same months, the system is most liable to attacks of diarrhoea, convulsions, and other troubles of a reflex nature, so is it liable to this disease, which takes its origin from an impression of a similar nature, only affecting the motor centres of the spinal cord in the most intense degree, instead of the cerebral or other centres. Wherever a full account can be obtained, sufficiently near to the date of the attack to allow a clear recollection of the antecedents, it is found that these have been of one of the following characters. In what may be called the typical form of onset, the child, after exposure to some form of violent alteration of temperature, such as a chill, after being submitted to the influence of a high temperature, of which I have given many instances in the paper before mentioned (and to which there are generally added circumstances of exhaustion), is seized with rigors; high temperature, 104° to 105° Fahr.; a variable degree of hyperæsthesia; often vomiting or nausea; frequently some difficulty in passing urine;* with tenderness over the spine, and often pain when the limbs are moved; great restlessness, and sometimes heavy, almost comatose, sleep. After waking from this sleep, or if this be not present, then gradually the tenderness and pain on movement subside, the febrile symptoms abate (but a higher temperature than normal may persist for some time), and the child is found to be paralysed in one, two, three, or, it may be, all four extremities; and frequently the muscles of the neck and back may be also involved, or even occasionally the face and the tongue. In another class of cases (14 out of 149) the paralysis is preceded by convulsions; while, in a third form, the attack is preceded by one of the exanthemata, or by whooping-cough, or diarrhoea. Of 149 cases, 24 were of this class. It has been coincident with the cutting of a tooth thirteen times, and therefore attributed to that cause, in the absence of any history of exposure or other peripheral irritation. But my own opinion is, that it is the condition of the nervous system at the period of the dental evolution that predisposes to the attack, by rendering the body more susceptible to external impressions, rather than the evolution itself, and I regard these rather as instances of defective history, than as true types of the onset. Pressure upon nerves and various forms of mechanical injury have been adduced as causes, but my own experience has been that these belong to quite another category of paralyses. Some writers have divided these cases into as many as nine different classes, distinguished by the mode of onset; but the other classes belong, in my opinion, rather to one general group, where the history has been defective or ill-observed, and the three forms I have mentioned alone really include the characteristic types of the mode in which the disease sets in.

In several of the cases in which convulsions occurred, they were repeated after the paralysis was perceived, and in a few there was a temporary loss of consciousness; thus pointing to cerebral as well as to spinal irritation. Indeed, from the undoubted cases (12 in 149) in which the early stages have been accompanied by affection of the tongue, face, and neck, I hold it to be proven that the brain itself is not unfrequently involved in the disturbance which leads to palsy. Nor do I see why this should be doubted, if we bear in mind that the two organs are continuous, and that experiment has proven that irritation of

* The bladder-troubles are quite temporary, though there often exists a greater sensitiveness of the bladder than is normal, and the patients are liable to pass urine involuntarily when frightened, spoken to sharply, or during electrical changes of the atmosphere.

the motor centres of the cerebrum has led to lesions in the anterior cornua of the cord. (Pitres, *Société de Biologie*, 1878. MacDonnell, Dublin Pathological Society, 1878.)

Immediately after the subsidence of the febrile symptoms, the keenness of the sensibility seems to be somewhat blunted, as though the nervous influence had been exhausted by the previous excitement; but it speedily recovers, and afterwards remains unchanged. Kennedy gave an account of certain cases in which complete recovery took place; but Heine and Duchenne both denied that these were true examples of this affection, and placed them in a separate category, under the title of "Temporary Paralysis." I am, however, satisfied that there are cases, probably much more frequent than physicians imagine, in which the regression is complete; and I have given instances, which differ in no respect from those which go on to atrophy and deformity, except in the slighter degree of the initial disturbance, and the fact that, after a brief period of paralysis, the regressive movement is carried to its full extent, and the child recovers, without any permanent traces of the attack. It is to be remarked that in all those cases where there existed facial paralysis, or paralysis of the muscles of the neck, these parts were the first to recover their power; and the same holds good of the muscles of the trunk, when they are affected together with the lower extremities; and that in all those cases some groups of muscles remained paralysed, and eventually became atrophied, while others recovered, and that they presented the electrical reaction peculiar to this form of palsy.

Heine asserted (and he has been followed by several other writers) that the true hemiplegic form of palsy never occurred in this disease; but I have seen it in thirteen cases, where the other diagnostic marks were distinct and incontestable. But, as explanatory of the cause of error, I may mention that it was persistent in both limbs of one side in only two cases; in the other it retired, leaving only one limb permanently affected. The crossed form, where the arm and leg of opposite sides are affected, is the most common form when two limbs are paralysed definitely, and was called by Heine spinal hemiplegia. It is the result of an attack affecting primarily either three, or it may be all four limbs (which occurred eighteen times), and which has receded from one or two, leaving the other on opposite sides definitely paralysed.* Of this I have five of the eighteen, the remainder ending in palsy of one leg only. I have not met with any case where there was a progressive increase of paralysis, or where an attack has recurred.

With regard to treatment and its results, I must confine myself here to stating, that hopefulness and perseverance will meet with a reward often exceeding expectation, especially if the treatment be commenced early, and the child's volition be called in to aid the efforts of art.

In conclusion, I may venture to offer a few remarks as to the manner in which the paralysis is brought about. It has been proved by Brown-Séquard, Tiesler, and others, that irritation of a nerve will produce lesion of the spinal cord; while the nerve-trunk, between the seat of irritation and the cord, presents no trace of any irritant action; so that it is quite easy to comprehend how any irritant impression upon a large surface, supplied by peripheral nerves, may cause a profound impression upon the centres to which they lead, just as we know that similar irritants affecting other peripheral nerves will cause convulsions, which are in young children often the expression of irritation of the motor centres (cortical) of the cerebrum.

That the great ganglion-cells of the anterior cornua are connected with special and peculiar nerve-fibres is probable, nay, almost certain; and, if that be so, then the explanation of the facts and peculiarities of this form of palsy is easy. The picking out of single muscles, or groups of muscles, for definitive palsy and atrophy, coincides with the picking out of certain ganglion-cells for destruction, amid others left sound; just as the groups of those vanished cells correspond with the enlargements from which the nerves to supply the wasted limb are given off. And an irritative inflammation, commencing in the cell as the focus of irritation, would, though it might spread readily enough to the surrounding parenchyma, still leave its greatest effect and most lasting traces upon the cell itself. Probably, the first effect of an irritation is to produce changes in the circulation of the nerve-centre itself, and thus involve the surrounding parts, to which the vessels so altered are distributed. At any rate, it appears from *post mortem* records,† that the parenchyma is largely involved early in the process; and, that it is through the instrumentality of the circulation is probable, not only from analogy, but also from the enlarged condition of the circumvascular spaces, which is a common characteristic of the *post mortem* conditions found in these cases.

Lastly, I would urge that the time has come when a greater degree

of generalisation may be profitably admitted in the study of this disease, which has hitherto been almost entirely subjected to analytical examination, a process so essentially needful for the distinction and verification of facts, in a new and unexplored field; but which, when once a sufficient number of facts and observations have been collected, serves rather to cramp and fetter the mind of the inquirer, who should then carry his researches into the wider fields of synthetical study, and ask what are the relations of the facts already known to other forms and manifestations of a different character.

A CASE OF SALTATORY AND GENERAL CLONIC SPASM TREATED WITH CONIUM.*

By E. H. JACOB, M.D.,

Physician to the Leeds Dispensary; late Resident Physician to the Leeds Infirmary.

THE patient whose case is described below has been under my notice twice; the first time, in the Leeds Infirmary (under the care of Dr. Eddison); the second, under my own care at the Dispensary.

J. E. A., aged 27, an iron-moulder, was admitted to the Leeds Infirmary on August 13th, 1878, and gave the following history. Four years ago, his foot was crushed by a stone. The next day, he was seized with a general shaking of limbs and body, which lasted about an hour. This was followed by similar attacks at intervals; but he was generally relieved by resting for a day or two. Eighteen months ago, he received a severe blow in the lumbar region from a crane, which was immediately followed by an attack of shaking. He continued to work, however, though the attacks became much more severe, till about four months before admission. For the last few days, he had had from one to four attacks a day.

On admission, he was fairly nourished, but looked pale. He complained of nothing but the attacks of trembling. These attacks appeared to begin with a slight quivering of one leg; this spread until the muscles of both legs were in rapid vibration. The abdominal muscles were tense, but not quivering. Generally the arms were involved, and occasionally the head. The shaking stopped temporarily if the limb were gently moved. The attacks came on occasionally at night, sometimes without awaking him. There was slight tenderness over the lumbar spines. His appetite was good; his bowels regular. The day before admission, he had two attacks, lasting one hour and half an hour respectively. Sometimes they lasted four or five hours; but he occasionally went eight to fifteen days free from them. He was kept in bed, and ordered half an ounce of conium-juice three times a day.

August 15th. He felt but little effect from the medicine, but had but one attack yesterday, lasting twenty minutes only (the shortest attack hitherto had been about fifteen minutes). He slept well. On August 16th, he had no more spasms. On September 7th, he was discharged, having had no more attacks. The succus conii had been continued in doses of six drachms.

I heard no more of this patient till the end of September last, when he was sent to the Dispensary, to be under my care, by Mr. Stamp Taylor, to whom he had applied for advice. He was then in a far worse state than when I had seen him before. He was pale and wasted, and was just beginning a spasmodic attack similar to those he had in the Infirmary. For the last month, he said, he had suffered from them from one to four times a day.

Beginning with tremor of the legs, the spasm grew more violent, till the patient fairly leaped into the air about eighty or ninety times a minute. His arms then became affected, but to a slighter extent than his legs; and sometimes his respiratory muscles joined in the general spasm, so that he breathed in short painful jerks. He declined to lie down, saying he had rather stand and jump if he had anything soft to stand on, as when he lay down "it shook him to pieces". He had been curious enough to count his leaps, and told me he had had thirty-one thousand in the last month. I gave him, on the spot, two drachms of tincture of conium, the only preparation which happened to be at hand; and ordered him half an ounce of conium-juice three times a day. The tincture of conium had no effect; but the attack passed off in about twenty minutes, leaving him much exhausted. There was some tenderness over the last two lumbar spines, and pressure there gave him a "sensation of cold". He did not know anything in particular which started the spasms, and no pressure-point could be detected.

October 7th. The medicine had had no effect. He had had one or more attacks every day. During the visit, the right arm and leg were shaking vigorously; but there was no leaping. He was ordered to increase the dose of conium till he felt the characteristic effects with which he was familiar, from his previous use of the drug.

* Read before the West Riding Medico-Chirurgical Society.

* When the hemiplegic form persists, it is probable that it is also produced by regression from one limb where three have been originally involved.

† See Report of meeting of Pathological Society of London, February 4th, 1879.