eases as measles, scarlet fever, erysipelas, or simple catarrhal inflammation of the fauces and air-passages, is intelligible enough, if we bear in mind the following notorious and indisputable facts.

1. All classes of society are daily exposed to the risk of poisoning by sewer-gas. 2. Sewer-gas is one of the most frequent vehicles of the diphtheritic poison, or the septic agency which excites diphtheria. And 3. This septic poison is notoriously apt to inoculate an abraded cutaneous or an inflamed mucous surface. Here, then, is the explanation of the fact, not that other diseases are grafted upon diphtheria, but that diphtheria is apt to be grafted upon other diseases which cause inflammation and abrasion of the throat. If, then, we consider, on the one hand, these acknowledged facts in the history of diphtheria, and, on the other, the notorious absence of membranous exudation as a result, in innumerable cases, of the most intense catarrhal inflammation of the fauces and air-passages, we surely are right in maintaining that upon those who still hold the theory, that there is a form of membranous croup which is not the result of the septic agencies which develop diphtheria, rests the burden of proof. I do not doubt that membranes more or less resembling diphtheritic exudations may result from various influences; but a careful inquiry will serve to show their essential difference. Thus Dr. Greenfield stated that the exudation produced by the injection of ammonia into the air-passages of dogs "is in no way comparable to that of ordinary membranous laryngitis"; also that the membranes ejected in Mr. Reid's case of eau de Cologne inhalation were unlike the exudation in any case of membranous laryngitis; and that the membrane expectorated by Dr. Poore's patient after exposure to a cold wind was hydatid.

I find no evidence to support the doctrine that a true membranous laryngitis results from any other cause than an infecting septic agency allied to, if not identical with, the diphtheritic poison. The author of the article in question says that "the majority of the members of the medical profession believe in the existence of membranous croup as one disease and diphtheria as another". This may be true of the profession in this country; but most assuredly it would not be applicable to the members of our profession in France, who, as regards this question, are a quarter of a century in advance of us; and obviously it is incumbent upon those who endeavour to influence professional opinion upon an important pathological and practical problem to ascertain, not what the majority believe, but what doctrine has the preponderance of evidence in its favour.

The term croup has been applied, and will continue to be applied, to three distinct forms of disease. 1. Laryngismus stridulus, a pure neurosis, unassociated with structural disease in the larynx or trachea, has been called "*spasmodic croup*". 2. Catarrhal laryngitis, the result of cold, apt to recur again and again in the same individual, characterised anatomically by congestion and swelling of the mucous membrane of the larynx with a muco-purulent exudation, but not by the formation of a coherent false membrane. This is *inflammatory croup*. 3. Laryngo-tracheal diphtheria, characterised by the formation of a more or less tenacious membrane in the air-passages, usually but not constantly associated with the appearance of a similar membrane on the palate and fauces. This is *membranous croup*—a contagious disease—the result either of infection from a previous case or of inoculation by a septic poison.

THREE CASES OF ACUTE ANTERIOR POLIO-MYELITIS (ACUTE SPINAL PARALYSIS) IN ADULTS.

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ONE of the commonest diseases of the spinal cord, and one which has received, perhaps, more study than any other at the hands of physicians and pathologists, is the condition which is familiar to all practitioners under the name of "infantile paralysis". Yet, although it is frequently met with, and although in its clinical aspects it is well defined, and in the greater number of cases easily distinguished from all other diseases, it is not many years since the first careful description of the disease was written, and it is still more recently that its pathology has been understood. A few isolated cases seem to have been put on record in the latter half of the last, and in the early decades of the present century; but it was not until 1840 that the disease came to be recognised as a distinct clinical entity. In that year, a careful account of it was written by von Heine, who called it "spinal infantile paralysis". He confined himself, however, to giving an accurate description of its clinical features, leaving its pathology to be explained by others. The pathology remained unexplained for nearly a quarter of

a century; for it was not until 1863 that Cornil first recognised a morbid condition of the spinal cord in cases of this kind. Cornil was unable to arrive at any satisfactory conclusion regarding the localisation and nature of the lesion; but in 1865, Prévost and Vulpian stated that the morbid changes were principally confined to the anterior horns of grey matter, a statement which was before long confirmed by Lockhart Clarke, Charcot, and others, and which has now taken its place as one of the most certain facts in pathology. There has been some little difference of opinion as to the exact nature of these changes, some believing that the primary condition is an acute inflammation of the true nervous tissue; others that the interstitial connective tissue of the cord is the starting point of the morbid process. But however that may be—and the question must at present be left an open one—the disease may be looked upon as due to an acute inflammation of the anterior horns of grey matter, either confined entirely to these horns, or diffusing itself more or less widely in their neighbourhood. The inflammation may resolve entirely; or, as is far more commonly the case, it may produce more or less damage to the organ of a permanent nature, destroying the softer, more delicate tissues—namely, the nerve-cells and nerve-fibres, and producing overgrowth of the harder less vitalised interstitial connective tissue. As the result of these changes, we have the phenomena of "infantile paralysis".

It was for some years thought that this disease was one peculiar to young children, a belief which originated in the fact that it occurs very much more frequently in them than in adults, and which has been fostered and encouraged by the designation by which it is almost universally known. One of the results of the immense advance which has been made in the last few years in our knowledge of nervous diseases, has been to show that "infantile paralysis" is by no means confined to children, but that it is met with, though less frequently, at almost any period of life. It is often the case with discoveries, that the merit of having been the first to make them is disputed by two or more observers. The discovery is not made by a sudden leap, but is gradually led up to by a succession of advances; and as several men are working in the vein thus opened up, it frequently happens that two or more workers reach the goal about the same time, but quite independently of one another. So here, the merit of having been the first to describe cases of spinal disease in adults, which resembled in all points the condition known as "infantile paralysis", is claimed in France for Duchenne de Boulogne, and in Germany for Moritz Meyer. As a matter of chronological fact, it would appear that Meyer was the first to publish cases of this kind, but that the first detailed description which showed the position which such cases should hold among diseases of the spinal cord was given by Duchenne shortly afterwards. Since that time, cases have been reported in France by Charcot and one or two other physicians; in Germany by Bernhardt, Kussmaul, Erb, Weiss, etc.; in America by Seguin; but in this country, so far as I am aware, the only cases published have been by Dr. Althaus, in a paper which he read last year before the Medical Society of London, and which he has since published;* a case described by Dr. Glynn of Liverpool, in a lecture which he published in the *Lancet* for September 21st, 1878; and a case in a lad of 14, described by Dr. Octavius Sturges in the *Lancet* for January 4th and May 3rd, 1879.

In consequence of the discovery that the disease is not confined to young children, the name "infantile paralysis" has lost its force; and as it has now been settled beyond dispute what is the pathological basis of the disease, an endeavour should be made to supply in its place a more strictly scientific name, one which shall in itself indicate the true nature of the disorder. It is not very easy to designate in two or three words a condition such as that which forms the pathological basis of this disease; and hitherto nothing better has been devised for the purpose than the somewhat uncouth name with which I have headed this paper, namely, "acute anterior polio-myelitis" (πολιός = grey), for which we are indebted to Professor Kussmaul. The name has been adopted by Professor Erb in his article in the recently published volume of Ziemssen's *Cyclopædia*, on Diseases of the Spinal Cord; and in this country, Dr. Althaus has described the disease under this name in the little work just referred to. It would seem, therefore, that the name is one which is likely to be permanently adopted.

It will be scarcely necessary to recapitulate the symptoms in an ordinary case of infantile paralysis; the feverish attack, with perhaps pain in the back and limbs, followed within a few hours or a few days by very rapid onset of paralysis in one or more limbs, the paralysis being associated with absolute muscular flaccidity, but usually unaccompanied by any marked modification of sensation; the more or less complete recovery of certain groups of muscles, others being left per-

* On Infantile Paralysis and some Allied Diseases of the Spinal Cord. By Julius Althaus, M.D., M.R.C.P.

manently damaged; the rapid wasting of the damaged muscles; and the presence of the now well-known "degeneration reaction" in them, *i.e.*, loss of irritability to the induced current, whether applied to the muscle itself, or to the nerve supplying the muscle, loss of irritability to the constant current when applied over the nerve, and increase of irritability to the constant current when applied over the muscle, this latter property disappearing after the paralysis has lasted a certain length of time. Last of all, the resulting deformities in the member—imperfect development of the limb, contraction of unopposed muscles, producing club-foot, etc., dangling flail-like joints, and other well-known and frequently occurring conditions. Cases are met with presenting every degree of intensity, from the child who is unable to move a muscle in any one of its limbs, to the case in which one or two muscles only of one limb are partially paralysed and wasted. The cases most frequently met with, however, are those in which one or more groups of muscles of one limb are affected in varying degrees, leaving certain other groups in the same member nearly or wholly free from disease; and it is these cases which superficially present the greatest contrast to those forms of paraplegia which result from myelitis of wider range, in which both limbs are almost always affected, and in which all the muscles of one limb present about the same degree of weakness.

Most of the cases described by Professor Charcot, both of those recorded by Dr. Althaus, and also the cases described by Dr. Glynn and by Dr. Octavius Sturges, of the disease as it occurs in the adult, correspond to the more severe degrees of infantile paralysis, several of the limbs being affected to a very marked extent. The three cases which I am about to describe, on the other hand, closely resemble those slighter and more common forms of the disease in which a single group of muscles in one limb is affected, the muscles being weakened and wasted; or where, even though several groups of muscles are involved, the amount of damage varies in the different groups.

CASE I.—F. P., a Pole, aged 44. His father died, aged 56, of a tumour in the larynx, which the doctor said was "cheesy". There was no history of neuroses, tubercle, or gout in the family. The patient was married, with six children; he was a merchant in good circumstances till nine years before this illness. Since then, owing to failure in business, he had worked in zinc; he had never worked in lead at any time. His previous health was always excellent, until within three years of his present attack. There was no history of syphilis. For the last three years, he had been living very poorly in consequence of his reduced circumstances. There was a history of an abdominal attack which came on about a year before the present illness. He was, seized with vomiting, diarrhoea, and severe pain in the left side of the abdomen. The pain lasted for several months, but the diarrhoea was replaced by constipation. He was treated for nine weeks as an in-patient at the German Hospital, and was very much relieved. The present illness began in September 1874. Except for the slight remains of the illness just described, he had been in fair health, from time to time suffering from slight pain in one knee. One morning, after walking to the railway station in the rain and getting damp, he sat down to wait half an hour for a train. Both at the station and afterwards in his workshop, he sat in a draught. In the afternoon, he felt pain in both shoulders. That night he woke up from his sleep with "horrible pain" in the shoulders. The shoulders were very stiff, and he was in a profuse perspiration. Next day, he was taken to the German Hospital, where he was admitted an in-patient, under the care of Dr. Hermann Weber. The pain and stiffness soon extended down the arm, but were worse on the right side than the left, the right arm becoming "perfectly useless", but with the left he could still carry a cup of coffee to his lips. The pain was very acute, and was increased by movement of the limbs; it did not seem seated in the joints, but rather in the fleshy part of the arms, and in the forearms was worse two or three inches above the wrists. There was no particular pain in the fingers. He believed there was slight swelling of the finger-joints, but he did not recollect swelling of any of the other joints. At the end of a fortnight, he began to have pain and stiffness in the knees, ankles, and feet; but these were never so severe as in the arms. He was three weeks in bed, by the end of which time all his limbs were considerably better. He was beginning to be able to walk about, and to do things for himself, but there was still acute pain in the right forearm when the muscles were put on the stretch; consequently his arm was carried in a sling. During the whole time he was in bed, he sweated profusely. He said his temperature was taken regularly, and that it was never so high as 100 deg. Fahr.; he was told, moreover, that there was very little fever. At no time did he complain of pain in the back, or any sense of constriction round the chest, waist, or elsewhere. His bladder was unaffected.

After he began to get better, he noticed that the muscles of the legs, arms, and trunk had become smaller than before his illness; he was very much thinner altogether, and he attributed the shrinking of his

muscles entirely to this fact. He was in hospital for seven weeks, and, when discharged, was able to walk moderate distances without limping, and to use the left arm well; the right arm was, however, still stiff, weak, and painful when moved.

A fortnight after leaving hospital, he had a rigor one morning, which came on without apparent cause; he had not been exposed to cold in any way. The rigor ushered in a severe illness, in which for a week he was delirious. He cannot give many details of this illness, but he says he was in bed for a fortnight; that he was free from pain, but was so weak that he was scarcely able to move himself in bed; that he had to be fed every two hours night and day; and that towards the end of the fortnight he began to cough, and had a great deal of expectoration, whether bloody or not he cannot say. The cough lasted on and off for some months; but for some time past he had been free from it.

Since his previous illness, the muscles of the arms had never properly recovered their strength; the left had been gradually improving; he thought, however, that latterly the right arm had been growing stronger, and it had now quite lost the pain and tenderness which were present in the biceps and muscles of the forearm for some time after the acute illness had passed off. The weakness had, however, been sufficient to prevent him from following his trade. He had had a little weakness in the left leg, which had seemed to him to lie chiefly in the muscles on the front of the thigh. This had not prevented him from walking fairly well, and latterly he had been able to walk three or four hours at a stretch.

Since his illness, he had noticed that the skin of the front of the right forearm was less sensitive than that of the corresponding part on the left side. When pressed firmly or pinched, it felt as though it were being pricked. There was also a numb patch of skin, about the size of the palm of the hand, on the front and outer aspect of the left thigh, a little above the knee. He said he had noticed this for about six years, but that the numbness had been more marked since his illness. There was no other affection of sensation, either in his arms or legs.

The patient was admitted as an out-patient at the National Hospital for Paralysis and Epilepsy in Queen Square in July 1875, under the care of Dr. Hughlings Jackson. He was very anæmic, and he looked old for his age; his hair was quite grey; *arcus senilis* was moderately marked; there was commencing rigidity of radials. His general health was fairly good in other ways.

Condition of Muscles.—The trapezii and sternomastoidei were symmetrical on the two sides. The action of shrugging his shoulders was well performed, and equally so on both sides.

Upper Extremities.—The right deltoid was more flabby than the left, and it had much less power of resistance to forcible movement than the left deltoid; the latter muscle appeared to be healthy. The biceps was flabby and much diminished on the right side. When the arm was extended against his will, the biceps offered only slight resistance. The left biceps appeared to be healthy. The triceps was somewhat weak on the right side, but in a much less degree than the biceps. There was decided weakness of the muscles both on the front and on the back of the right forearm; the left appearing to be healthy. The dynamometer indicated a pressure of forty-three *kilogrammes* with the left hand, but of only thirty-two with the right. The middle of the arm measured ten inches and three-eighths on the right side, and ten inches and three-fourths on the left; the greatest circumference of the forearm appeared to be rather greater on the right than the left side—the usual condition in health. There was no noticeable weakness or wasting in the small muscles of the thumb, and the interossei appeared to act equally well in the two hands.

Electric Reaction. A. Induced Current.—There was a very distinct loss of reaction in the right deltoid; the difference in irritability between the right and the left muscle being represented by a difference of three divisions on the bar of the instrument (Stöhrer's). The irritability of the right biceps muscle had almost disappeared, a very strong current producing only a slight flickering contraction in the muscle; the irritability in the right triceps had slightly diminished as compared with the left. The brachialis anticus was scarcely at all affected, and it was almost wholly with this muscle and the supinator longus that he flexed his elbow. There was slight loss of irritability in most of the extensor muscles on the back of the forearm, but scarcely any loss in the flexors on the front of the forearm. The short muscles of the thumb acted equally well on the two sides; but the interossei of the right hand were very distinctly less irritable than those of the left hand.

B. Voltaic Electricity (rheophores over muscles; Stöhrer's battery; slow interruptions; contractions produced on closing the circuit).—There was very little difference between the two deltoids, but the right appeared a little more irritable than the left, contracting first with a current from twelve cells, the left contracting with a current from

fourteen cells. The right biceps did not contract even when the current from thirty cells was applied; the left biceps reacted to twelve cells. Both triceps muscles reacted to twelve cells. The flexors of the right forearm reacted to twelve cells; those of the left to fourteen cells. The extensors of the right forearm reacted to eighteen cells; those of the left to twenty cells.

Some of the muscles attached to the right scapula were affected. There was evidently some weakness of the serratus magnus, for the posterior border of the scapula stood out much further from the back on the right side than on the left. This difference was brought into greater prominence when he held his arm straight out in front of him. The angle of the scapula did not become so completely separated from the muscles of the back as when the serratus magnus was completely paralysed, but its position was an approach to that condition. There was very marked deficiency in reaction to the induced current in the muscle on the right side, amounting, as compared with that of the left, to six divisions in the bar. There was also a marked diminution in reaction to the constant current. The right rhomboidei muscles were also somewhat wasted, and their irritability to the induced current was very distinctly less than on the left side, the difference amounting to two degrees on the bar. The latissimus dorsi and the pectoral muscles were not affected in any way. There was apparently nothing now amiss with the legs.

The patient was ordered to have voltaic electricity applied over the affected muscles (labile current), and under its influence there was considerable improvement. The biceps was too far gone for recovery, and there was no change in the serratus magnus or the rhomboidei. He became, however, so much stronger in the arm, after three or four months' treatment, that he was able to resume his work.

[To be continued.]

CONGENITAL MALFORMATION OF BOWEL: AMUSSAT'S OPERATION.

By EDWIN FAIRLAND,
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ON September 14th, 1878, I attended a lady who gave birth at full term to her seventh child, a male, who, to all external appearance, was well and naturally formed. Some years ago, she had had a female child, who died, the parents told me, within four days of birth, from the absence of any outlet from the bowel, the anus being only a short cup-shaped cavity. This child died in great agony, convulsions terminating its existence, no operation having been performed for its relief.

The child now born failing to have any action of the bowels up to the second day, I made an examination of the rectum, and discovered that the gut extended only about two inches and a half from the anus, there terminating in a *cul-de-sac* of thickened membrane. The child continued until the morning of the third day to be free from any pain; but the gradually increasing distension of the abdomen, and the stercoraceous vomiting which now set in, led to the determination to lose no time in adopting some operative interference to relieve suffering and, if possible, to save life.

The parents, aware how small a chance of life was afforded by any operation, and dreading the disagreeable results to the child in after-life in the event of one being successful, at first declined to allow anything to be done; but calm reasoning overcame their scruples, and they left the matter in our hands. Surgeon-Major J. Ross Murray, R.H.A., kindly assisted me both in determining the nature of the proceeding and carrying it into execution.

The finger in the rectum experienced a sensation of "forcing down" during an expulsive movement of the child; and at first we thought it possible to establish an opening into the bowel here, and attach the punctured extremity to the anal orifice; but the distance (two inches and a half) of the undeveloped gut from the anus obliged us to give up this idea. We then determined on performing Amussat's operation in the left loin. This we did *secundum artem*, two small arteries in the abdominal wall requiring torsion. On opening the abdomen, exploration was made for the descending colon; and, on withdrawal of the finger, a portion of the distended gut at once bulged through the wound. This was returned without much difficulty, and a portion was retained in the opening by ligatures passed through it transversely; these were attached to the edges of the wound, and an opening made in the long diameter of the intestine, the ligatures being secured in four places.

Comparatively little blood was lost, and the child bore the operation well. On opening the bowel, a large quantity of dark brown fluid faeces rushed out from the distended gut, giving great and almost imme-

diate relief to the child. From this time, it appeared to suffer no pain. Similar fluid came away at intervals from the opening. It took brandy and milk at short intervals, and finally died without a struggle eighteen hours after the operation.

Two hours after death, I made an examination of the abdominal cavity, with the interesting result portrayed in the accompanying sketch. The abnormality consisted in a bifurcation of the intestine,

A. The Stomach. B. Bifurcation of Intestine. C. Portion of Large Intestine patent during life, and distended with fluid food. D. Portion of Small Intestine apparently patent during fetal life, and filled with semi-solid meconium. E. Straight Tube connecting Caecum with Rectum. F. Undeveloped Rectum. G. Opening made by operation. H. End of additional Bowel.

commencing about an inch and a half from the pylorus. The small intestine marked D was in diameter about one-third of an inch; its coats were thickened and of a pale grey colour, and its canal impacted with semi-solid greenish meconium. It was tightly filled with this matter as far as the rudimentary caecum with its distinct vermiform appendix, from which continued a pipe-like portion of gut (E), terminating at the *cul-de-sac* forming the rectum (F). The second portion of intestine, marked C, was altogether larger, and more closely resembled a normal bowel; it was about thirteen inches long and one inch in diameter. Before the operation, it was distended with fluid, and had been the only portion of bowel patent since birth. But it terminated in a *cul-de-sac* (H), and formed, therefore, a species of pouch, from which there was no exit except by regurgitation. We had opened into this gut about three inches above the *cul-de-sac*, and thus had hit on a very suitable spot for the operation.

The result of our interference, as far as the saving of life was concerned, was of course *nil*; but it was so far advantageous that it removed all source of suffering and gave the child a painless death, in marked contrast, according to the parents' statement, to the agonies endured by the former child, whose death appears to have been one of unusual torment. I ascertained from them that they had both entertained a continual dread that their child might be born with the same singular abnormality that had characterised their other child. There can be no doubt that this thought impressed the mind of the mother very strongly. Are we to assume that this "impression" resulted in this remarkable divergence from the ordinary intestinal arrangement? or, if not, to what was it due?

WORTLEY RURAL, No. 1.—Dr. Drew's report for 1878 is very short, but, as he says, the sanitary state of the district calls for little remark. The death-rate was 21.2, or rather below the average of the years 1874-77. The number of deaths from zymotic diseases is not stated; but numerous local outbreaks of scarlatina, typhoid, and measles, and two of typhus, are reported.