AN INFECTIVE VARIETY OF TUBERCULOSIS IN MAN, IDENTICAL WITH BOVINE TUBERCULOSIS (PERLSUCHT).¹

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THE observations which I am about to relate were made by me partly while looking on at, or informally taking part in, the post-mortem examinations at Addenbrooke's Hospital, and partly in the course of examining microscopically the material which I had collected from time to time from the various subjects examined. From six out of the eight cases referred to in the sequel, I have preserved, for microscopic examination, larger or smaller portions of the affected parts; it was not with any preconceived opinion on the nature of all or any of the cases that I preserved the specimens, but because they appeared to me, as they occurred one by one, to be pathological curiosities that would repay study. As the view that I am about to explain gradually developed itself, and came to include within the same category cases that I did not at first associate together, I found it necessary to authenticate my observations by reference to the notes of the cases, and I desire to express my indebtedness to Dr. Latham and to Dr. Bradbury for the free permission that they have given me to make use of the cases. The conclusion that I arrive at cannot but appear at first to be somewhat venturesome, and I fear that I must take the responsibility of bringing it forward wholly upon myself. The present communication is preliminary to a more detailed account, and contains only an outline of the facts observed. I am much indebted to Mr. A. Shann, house-physician to the hospital, for giving me access to his notes of the cases.

CASE 1.—C. P.—, male, aged twenty-one, admitted April 14th, 1880, under Dr. Bradbury. History of cough and wasting for several months, and of dyspnoea for several weeks. Physical exploration of chest (details deferred) showed disease chiefly in left lung. After being thirty-six hours in the hospital he died suddenly. He slept quietly till about two or three minutes before his death; he suddenly began to gasp for breath, and died almost immediately.

Post-mortem.—The pulmonary arteries were searched for a clot, but none was found. The left lung contained a number of centres of disease, varying from the size of a walnut to the size of a pea; some of them were in the periphery of the lung, projecting on the pleural surface, others were in the centre. They were remarkable for their white medullary appearance. The centre of the mass was usually softened. In the base of the lung was an extensively excavated mass, into which a branch of the pulmonary artery appeared to open freely, although there was no appearance of hæmorrhage having taken place. The right lung contained only one mass, which was felt as an isolated nodule in the midst of the compressible lung substance; it occupied the hinder border of the lower lobe at its upper margin, and it was distinctly wedge-shaped, about an inch and a half long, of the same medullary consistence and colour as in the other lung, and softened in the centre. The spleen was very large, and the surface of it was covered with small flat white bodies of a pearly appearance, such as are sometimes described as occurring on the spleen, without any particular pathological significance being assigned to them.

CASE 2.—S. J.—, female, aged thirty-eight, admitted March 13th under Dr. Bradbury. Had typhoid fever in August, 1879, and has never been quite well since. Now admitted for certain ill-defined abdominal symptoms (details deferred). There was great fluctuation between morning and evening temperature, the record on April 8th, for example, being 99·2° morning, and 104·5° evening. Acute tuberculosis was diagnosed. On April 19th she became much worse, the face becoming dusky, and the respiration rapid. Died on 20th.

Post-mortem.—Both lungs full of translucent mililiary tubercles of a very small size. Small translucent tubercles on the pleura. In the lower lobe of the right lung there was a

well-marked embolic infarct, wedge-shaped, about two inches long, and one inch and a quarter broad at its base on the pleura. It was quite firm and somewhat tough, not at all broken down, of dry texture, and brownish-yellow colour, not everywhere of the same shade. In the abdomen there was recent peritonitis, the intestines being glued together. The whole peritoneum was covered with an eruption of large flat nodules, up to the size of a split pea, sometimes confluent, most abundant in the right iliac region, where there were old adhesions. They contained minute points of black pigment. Recalling the fact of typhoid fever six months before, and that healed typhoid ulcers may have black pigment in the cicatrix, I referred the peritoneal eruption to that source, and proceeded to unravel the matted intestines, so as to examine the ileum. I found only two healed ulcers; one of them was of considerable size just above the valve, and another half an inch in diameter, about a foot higher up. The latter I kept for microscopic examination, and a thickening, partly in the floor of the cicatricial depression, but more to one side of it, has afforded very remarkable specimens. Both cicatricial depressions had minute points of black pigment in their extreme centre. The peritoneal covering of the liver and spleen was studded with the same large flat tubercles as elsewhere. Mesenteric glands not altered in colour nor enlarged.

CASE 3.—E. P.—, female, aged seventeen, admitted on the 14th April, under Dr. Bradbury. Pulmonary symptoms since four months. On admission, physical signs of disease in lungs (details deferred); fluctuations between morning and evening temperature (e.g., 21st April, morning 100·8°, evening 103°); stupor, sordes, dry tongue, vomiting, delirium at night. Epileptiform fits on 17th and 21st. On the day before death, paralysis of left arm and leg; duskiess of face, and rapid respiration, preceded death on the 27th.

Post-mortem.—Body wasted. Left lung adherent, especially to diaphragm, its pleural surface covered with adhesions containing healthy translucent tubercles. The upper lobe was of a rose-red colour. In the lower lobe, near its upper and posterior angle, was a single well-marked wedge-shaped embolic infarct, 1½ in. long, and 1¼ in. broad at base, of white medullary colour, into which a branch of pulmonary artery entered underneath the thin end. The wedge-shaped area of white substance was composed of a number of round masses, the size of peas or larger, touching each other. There was another whitish mass at the extreme base, where the lung adhered to the diaphragm. A number of small white masses, with round central space, as if lined by a membrane. The right lung contained only the smaller kind of nodules. The pleura was studded with minute nodules. The peritoneal surface of the diaphragm on the right side was the seat of a most remarkable eruption of large, flat, confluent, lobulated nodules, from the size of a split pea downwards. This eruption was more like that of tumour infection of the serous membranes. The same kind of flat nodules occurred in the peritoneum covering the back of the bladder, and in the parietal peritoneum of the right iliac fossa. On the broad ligaments and surface of uterus the nodules were smaller, more pearly and sessile. There was an embolic infarct in the anterior end of the temporo-sphenoidal lobe of the right hemisphere, yellow softening extending for a short distance on each side of the middle cerebral arterial branch. Miliary tubercles in the Sylvian fissure on both sides.

CASE 4.—A. T.—, girl, aged eight years, admitted on the 22nd April, under Dr. Bradbury. Typical case of acute tuberculosis in a child; first signs of it five weeks before. Died on the 2nd May.

Post-mortem.—Large packet of caseous bronchial glands. Abundant tubercles on pleura, both pulmonary and parietal; the tubercles were white in colour, sessile, and even pedunculated. Both lungs were full of tubercles of unusually large size, and white medullary substance. At the right apex, a dense collection of white nodules, having the general outline of a wedge, with some lung-tissue within the outline not occupied by the white substance. The scattered white nodules appeared often to be perforated in the centre by a smooth-walled aperture. Tubercles on the surface of the spleen, and in the fissure of Sylvius.

CASE 5.—J. B.—, male, aged forty years, admitted on the 9th May, under Dr. Bradbury. Pulmonary symptoms said to have existed for two years. On admission: face congested; tremors of the tongue and facial muscles; much prostration; frequent cough, with expectoration of very offensive purulent sputa. Evening temperature 104·2°; next

¹ Paper read at the Cambridge Medical Society, June 4th, 1880.

morning 100°. Physical signs of lung disease on left side (details deferred). Before death, his dyspnoea increased much; face much congested; perspiration on forehead. Died on the 13th May.

Post-mortem.—Remarkable appearance in thorax. Bronchial glands formed a diffuent white mass, like the softer variety of lympho-sarcoma. Left lung firmly adherent; extensively oedematous; contained a number of gangrenous cavities, one of them (on the periphery) distinctly wedge-shaped; and, in the intervals between the cavities, the lung-tissue was occupied by a number of greyish nodules, of uniform size, as large as peas. I did not see the right lung, but the note is that it “contained a considerable quantity of caseous substance, just beginning to break down.”

CASE 6.—J. B—, male, aged eighteen, admitted on the 6th March, under Dr. Latham. Five months before, he had to give up his occupation of baker on account of weakness and shortness of breath. During the last month the dyspnoea has been constantly present. Four days before admission he was obliged to take to his bed. Physical exploration of chest reveals disease on both sides (details deferred). Delirious next day, and picking the bedclothes. Died on the 8th.

Post-mortem.—The parietal pleura was thickly studded in parts with tubercles. A few adhesions at base of both lungs. Pearly tubercles all over the surface of the lungs; same on the spleen, but more distinctly pedunculated, and sometimes tongue-shaped. The peritoneal surface of the diaphragm was thickly covered with large flat nodules, exactly as in Case 3. Intestines showed no appearance of tuberculosis. The striking feature of the post-mortem examination was the condition of the portal glands. They hung down from the portal fissure as an extensive tuberculous mass, about five inches long; the glands composing it were united by connective tissue, but they were rarely confluent; some of them were very nearly the size of a hen's egg. The portal vein (and the splenic and superior mesenteric before their junction) were closely involved in the growth, the glands appearing to grow into their walls. The substance of the growth was very firm, hard, creaking under the knife, brownish-yellow (like the embolic infarct of Case 2). This kind of substance occurred in each gland in the form of several round centres, separated by bands of translucent tissue, the whole being enclosed in a thick translucent capsule. There were several bronchial glands which presented exactly the same appearance of round yellowish-brown nodules, the size of peas, scattered through their black pigmented substance. Nodules, also the size of peas, and surrounded by a translucent thick capsule, in liver and spleen, along with smaller tubercles. Small tubercles in left Sylvian fissure. The condition of the lungs was like that of the next case, and will be referred to under it.

CASE 7.—T. C—, male, aged fifty-seven, admitted on Feb. 11th, under Dr. Latham. Quite well till seven weeks ago; then had quinsy. The throat was lanced by a surgeon, and a quantity of matter evacuated. Lost his voice at that time, and still speaks in a whisper. No cough or night-sweating, but has had sometimes shortness of breath. On admission there is no pain in chest or elsewhere, but constant slight dyspnoea. Temperature on two successive days: 101·8° morning, and 103·4° evening; 100·8° morning, and 103·8° evening. Before death severe dyspnoea. Death on Feb. 15th.

Post-mortem.—Both lungs firmly adherent all round. In the right lung a cavity the size of a walnut at the apex; the rest of the lung thickly studded with tubercles, small and translucent in upper part, opaque and becoming confluent at the base. The special interest centres in the condition of the left apex, which exactly resembled the condition in the corresponding apex of Case 6, and which is probably characteristic of the bovine disease. The lung was as if honey-combed with smooth-walled cavities from the size of a pin-head to that of a large pea or even a hazel-nut. To use a homely illustration, the lung resembled the substance of a crumpet. I at first took this condition for bronchiectasis; but the cavities are found to result from the central softening of large tuberculous nodules, the periphery of the nodules being formed of translucent and highly vascular tissue, which remains as a smooth membrane like the wall of a cyst. Solid whitish nodules of various sizes, up to that of a pea, were seated as if on the outer walls of the excavations, or in the lung-tissue between them.

CASE 8.—A. P—, female, aged eighteen, admitted moribund on Feb. 27th, under Dr. Latham. Died shortly after.

Post-mortem.—Body well nourished. The whole upper lobe of the left lung was occupied by one enormous cyst or cavity, on the inner surface of which there was not a trace of friable caseous substance. Its wall was compact like the wall of a cyst, and its inner surface was smooth or slightly granular, or finely trabeculated, and of a red colour, as if from blood. In the walls of the cyst and in other parts of the lung there were hard brownish-yellow opaque nodules from the size of a pea to that of a hazel-nut, sometimes slightly confluent, surrounded by a thick translucent capsule, and with lighter or caseous points in their centre. In the right lung, at the apex, there was a round cavity with a uniform inner surface, the size of a billiard-ball; its walls were of great density or firmness, creaking under the knife; a branch of the pulmonary artery appeared to end in its periphery. In the lung-substance round the cavity the same yellowish-brown encapsuled nodules as in the left lung. In the middle lobe of the lung the opaque nodules were smaller and more uniform in size, and at the extreme base they formed grape-like clusters. There were extensive pleuritic adhesions on both sides. On the surface of the lung there were a number of flat pendulous nodules, one of which, about three-eighths of an inch in diameter, was suspended by a piece of the adhesion, like a small medallion. Round the sharp margin of the right lower lobe there are a few small pleural nodules, partly fused into a cord, giving the margin a beaded appearance.

My contention is that these cases of tuberculosis are all of them cases of bovine tuberculosis; that they show the distinctive and specific characters of that disease in their pathological anatomy and are related to it in their etiology, and that they have precisely that relation to bovine tuberculosis which glanders in the human subject has to equine glanders. Bovine tuberculosis (*Perlsucht, Pommelière*) is a disease by itself, as much as glanders is. It is only from directing too concentrated an attention upon its histology that one would be led to conclude, with Schüppel,² that bovine tuberculosis is identical with the ordinary indigenous or autochthonous tuberculosis of man. It has well-marked distinctive characters,³ which appear to me to be reproduced more or less in all the cases above related. I must content myself for the present with summarising in the briefest way what may be considered to be the salient features of the cases that I have grouped together, without attempting to make out the identity with bovine tuberculosis from point to point. The salient points I consider to be: (1) the occurrence of tumour-like embolic infarcts in the lungs; (2) the implication of the bronchial, or of the mesenteric and portal lymphatic glands; (3) the characters of the new growth in the wedge-shaped infarcts and round nodules (of various sizes) in the lungs, and its corresponding character in the lymphatic glands; (4) the characters of the eruption in the serous membranes, and its relative frequency; (5) the microscopic appearances; (6) the element of obscurity in the cases viewed as cases of ordinary or autochthonous tuberculosis; (7) special points in Case 2.

1. *The Embolic Infarcts in the Lungs.*—There can hardly be a doubt that the isolated wedge-shaped masses in Cases 1, 2, and 3 were due to blocking of terminal branches of the pulmonary artery; in Case 3 a block occurred also in the middle cerebral artery. The infarcts so produced had a certain definite structure of new growth, and the emboli that gave occasion to them must be held to have been emboli charged with specific properties. In Case 4 there was one wedge-shaped area, which included, however, some patches of uninvaded lung-tissue; in the other more uniform infarcts, it could be seen that they were made up of the confluence of several round masses. In Case 5 the infection was of a more intense kind, and the infarcts had the appearance of gangrenous cavities.

2. *The Condition of the Lymphatic Glands.*—The occurrence of a packet of caseous bronchial glands in a case of acute tuberculosis in a child (as in Case 4) is hardly calculated of itself to arrest the attention. But in Case 5, aged forty, the white medullary, and even diffuent condition of the bronchial glands, resembling a very soft lympho-sarcoma, was remarkable. Still more remarkable was the extraordinary appearance presented by the portal glands in Case 6. The mass, which I spent some time in dissecting, was unlike scrofulosis on the one hand, and unlike lympho-sarcoma on the other. It corresponded to the tuberculous masses of

² Virchow's Archiv, vol. lvi. (1872), p. 38.

³ See Virchow's Lectures on Tumours (French translation), vol. iii., p. 184.

lymphatic glands found in bovine tuberculosis; the individual glands were some of them of very great size; they were joined together by connective-tissue, but the hollows between them were not so much filled up as in scrofula and lympho-sarcoma. The French name of bovine tuberculosis (*Pommelière*) is said to refer rather to the potato-like clusters of nodules that grow from the serous membranes; but the enlargements of the lymphatic glands seem to take on the same external form. A more reliable character is that each enlarged gland contains several distinct round masses (large tubercles). The implication of the abdominal and thoracic lymphatic glands is a well-known distinctive character of bovine tuberculosis.

3. *The Character of the New Formation in the Pulmonary Infarcts and Nodules, and in the Lymphatic Glands.*—Perhaps the most striking thing in the group of cases is the white medullary appearance of the lung infarcts in Cases 1, 3, and 4, and of the bronchial glands in Case 5. So far as colour went they might have been the softer variety of lympho-sarcoma; but they showed points of structure which lympho-sarcoma never shows. Virchow has remarked upon the resemblance, in some respects, of bovine tuberculosis to lympho-sarcoma. In Case 2, the solitary lung infarct was brownish-yellow, hard, and tough, and these were also the characters of the lymphatic glands (portal, mesenteric, and bronchial) in Case 6, and of the encapsuled round nodules in the lungs in Case 8. I believe the difference between the brownish-yellow and very hard formation, and the white medullary formation, to be that the former are products of a more chronic infection. The extreme degree of intensity of the infection is probably exemplified in Case 5, where the bronchial glands were diffuent, while the infarcts in the lungs resembled gangrenous cavities. Cretification, often observed in the bovine disease, was not found distinctly, but the nodules in Cases 2 and 8 were of extreme hardness, and I have observed in some of the microscopic sections the radial streaked appearance of the opaque brownish substance, which appears to indicate the approach of cretification.

4. *The Eruption on the Serous Membranes.*—It is from the character of the serous eruption that the German name *Perlsucht* is derived. Bovine tuberculosis has also been called “serous tuberculosis,” from the frequency with which the peritoneum and pleura are implicated.⁴ Cases 3 and 6 are remarkable for the eruption of large flat, confluent nodules on the diaphragm; Cases 4, 6, and 8, for the tendency to pedunculated nodules on the pleura. According to Virchow,⁵ the breadth and the pedunculated disposition of the serous nodules afford a striking means of distinguishing the bovine from those of man. The appearance of short strings of pearls is well marked in the pleural nodules of Case 4, and the beaded appearance of the thin margin of the lower lobe is noticeable in Cases 4 and 8. Tubercles of the serous membranes that are large and flat, sessile rather than embedded, often in pearl-like rows, often pedunculated, and even tongue-shaped, apt to be associated with adhesions, apt to form on the abdominal surface of the diaphragm, and round the sharp margins of the lung, and in circumscribed patches elsewhere, may be said to be indicative of the bovine disease. The relative frequency, or the preponderance of the serous eruption, is also a differential point.

5. *The Microscopic Characters.*—In all of the numerous microscopic preparations that I have made of the pulmonary infarcts and large round nodules, of the lymphatic glands, of the serous eruption, and of the floor of the ulcer in the ileum (Case 2), I have found *giant-cells*, not only in enormous numbers, but also of the most exquisite forms. One is naturally familiar with the occurrence of these remarkable elements under many different circumstances both of health and disease. They are in themselves not distinctive, but it is worthy of note that it was in the bovine variety of tuberculosis that they were first described and figured by Virchow.⁶ I have elsewhere⁷ contended for the vaso-formative significance of these elements, and I think it is certain that such is their significance in the nodules of bovine tuberculosis. The nodules in the above cases are often surrounded by a remarkable circlet or wreath of numerous and wide bloodvessels, distended with blood-corpuscles; internal to this lies the peripheral zone of giant-cells. I believe that the bloodvessels are new-formed, and that the giant-cells are the agents of extend-

ing the vascular formation still further. It is by this means that the excavated centre of the nodule is bounded by a smooth-walled membrane like the wall of a cyst, giving rise to the remarkable and characteristic appearance of the lungs that might be (and has been) mistaken for bronchiectasis. Without the aid of drawings it is difficult to enter more into the details of microscopic structure. I must be content to say that the brief description of the distinctive microscopic characters of bovine tubercles given by Perls⁸ corresponds with what I have generally observed in these cases, and most exactly with the appearances in the thickening near the healed ulcer of the ileum in Case 2. In general, it may be said that the bovine new formation, while it is by no means exempt from caseous necrosis, is better vascularised, more stable, and more like a vigorous connective-tissue formation than the corresponding indigenous product in man.

6. *The Cases otherwise unaccountable.*—In none of the cases, with the doubtful exception of the case in a child (Case 4), were the clinical facts or the appearances after death those of ordinary tuberculosis. Seven of these cases were in adults; there was, in none of them, caseous broncho-pneumonia; nor were there spontaneous centres of caseation elsewhere; the lymphatic enlargements were distinctly not those of primary scrofulosis, for the round nodules within them contained the same structural elements (including giant-cells) as the serous tubercles. In the clinical history, dyspnoea was more or less constant as a symptom.

7. *Special Points in Case 2.*—In the case of the woman who had typhoid fever six months before, I could find only two healed ulcers in the ileum, the one near the valve being of considerable size. In and around the floor of the other there was a considerable thickening, which has yielded me the best specimens of the microscopic structure that I possess. That the serous eruption of the peritoneum spread from the centre in the ileum is almost certain, from the fact that it reproduced the minute specks of black pigment in the intestinal cicatrices, according to the mimicry of infection. A doubt is suggested whether the disease six months before was really typhoid fever; and that doubt would extend to certain other cases, or groups of cases, supposed to be typhoid, and more particularly to the remarkable group of four cases recorded by Dr. W. H. Spencer.⁹ I do not doubt, after reading Dr. Spencer's cases, to which my attention was directed by Dr. Bradbury, that the outbreak in the industrial school, of which they formed the fatal contingent, was not an outbreak of typhoid, but one of bovine tuberculosis.¹⁰

Of the eight cases related above, four were in females, and the four males were of various occupations (baker, labourer, falconer). The patients came from various parts of town and country. It is probable that a special intensity of the virus and predisposition in the individual are in most cases necessary for the establishment and development to any considerable extent of the bovine disease in man.

At the International Congress for Hygiene, &c., held at Brussels in 1877, Professor Virchow spoke as follows:¹¹—“In conclusion, I would briefly direct attention to a question much ventilated in Germany at present—viz., in how far one of those diseases which we have hitherto regarded purely as a spontaneous disease of the ruminant animals—I mean bovine tuberculosis (*Perlsucht*)—is a communicable disease, and, indeed, a disease communicable to man. If this were the case, it would follow that sanitary regulations should be directed against this disease to a much greater extent than hitherto. It has, in the first place, been determined, by the inoculation upon other animals of substances from animals that have died of *Perlsucht*, that the disease may be communicated exactly in the same way as in the inoculation of tuberculosis. On that point there is in Germany no longer any doubt.¹² A further question is, whether, by the partaking of substances coming from a tuberculous (*perlsuchtig*) animal, similar, and, in fact, tuberculous, diseases may be induced in man. This question divides itself into two main points—in how far such an infection may arise from the partaking of flesh; in how far through milk.”

So far as I am aware—and I rely on the statement of

⁸ Lehrbuch der Allgemeinen Pathologie, 1877-79, Bd. i., S. 299.

⁹ Bristol Royal Infirmary Reports, 1878-1879.

¹⁰ See also Dr. Spencer's additional case at page 36.

¹¹ Address reprinted in his *Gesammelte Abhandlungen aus dem Gebiete der Oeffentlichen Medicin*, 2 vols. Berlin, 1879. Vol. ii., p. 627.

¹² See Gerlach, Virchow's Archiv., vol. li. (1869), p. 290.

⁴ Virchow, loc. cit. ⁵ Loc. cit., p. 189.

⁶ Archiv., vol. xiv. (1858), p. 47.

⁷ Journal of Anatomy and Physiology, vol. xiii. (1879), p. 183.

Professor Virchow, in an address on this subject made a few weeks ago to the Medical Society of Berlin—no series of cases have yet been described as cases of specific and distinctive bovine tuberculosis communicated to man. It is as such that I regard the above cases. I say “specific and distinctive bovine tuberculosis” (*Perlsucht, Pommelière*), and I am not concerned to maintain, according to the conjecture of Klebs, that any other variety of tuberculosis in man is referable to that extraneous source.

It may be convenient also to take the present opportunity of pointing out that the above observations give no countenance to what is called the “parasitic” theory of an infective disease. The bovine disease in man reproduces, on the whole exactly, the morphological features of the disease in the cow. When it comes to be a matter of conveying somewhat special and even complex morphological features—as distinctive as the pattern of a wall-paper or a carpet,—it is in the juices and particles of the tainted animal that we must suppose the contagion to reside.

FURTHER HISTORY OF TWO CASES OF CEREBELLAR DISEASE, TOGETHER WITH NOTES OF A THIRD CASE SIMILARLY INDUCED BY A FALL, AND COMPLICATED BY INCIPIENT HYDROCEPHALUS.

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A CLINICAL lecture on two cases of cerebellar disease occurring in children, and in each instance as a result of a fall upon the occiput, was reported in THE LANCET of Aug. 17th and 24th, 1878. One of these cases has since terminated in complete recovery, and the other in death, mainly owing to the sequential development of chronic hydrocephalus; and as both of them are, from different causes, of rather exceptional interest, I now propose to supplement the account which has already been given by some additional notes.

Concerning the elder of the two children, Jessie J—, aged ten years, not much requires to be said. The symptoms in her case were of an acute and urgent character throughout the earlier stages of her illness. She began to suffer almost immediately after falling over a flight of ten stairs, when she struck the occiput and the lumbar spine principally. The symptoms consisted chiefly of occipital pain, uncontrollable paroxysms of sickness, fits, gradually failing sight till nearly total blindness was produced, and a staggering gait followed by almost complete powerlessness. These symptoms attained their maximum severity from the sixth to the ninth month after the accident. In reference to this time, the notes already published say: “About the middle of October, and thence onwards to Christmas, she became decidedly worse, and it was scarcely considered possible that she could recover. The pains and sickness were most obstinate. The sight became much worse. She could not stand at all for some weeks, and for a time she could not sit up, or even raise her head from the pillow.” In the month of January, 1878, she began to improve, and continued to do so steadily in all directions, so that she left the hospital on April 8th with her sight greatly improved, able to use her hands as well as ever, and walking fairly well, though still having a staggering and abnormal gait. As late as July in the same year, her gait was still unnatural, but she was practically well in all other respects. Her mode of walking is thus described:—“She treads overmuch on her heels, keeps her legs well apart, reels slightly, and occasionally brings the feet down quickly. In fact, she walks in some respects as a person does on the deck of a vessel, in a rather rough sea. There is, however, no giddiness even when the eyes are closed.”

When last seen, a short time since (March 13th, 1880), this child, now twelve years old, was convalescent from an attack of typhoid fever which had confined her to bed for six weeks. She had been “up and about” only for the last

two weeks. She walked across the room quickly with a slight and scarcely appreciable unsteadiness, and according to her father's account only rarely showed any tendency to stumble. Her sight was good for all ordinary purposes, and she could read and work like other children. Optic discs were now of almost normal colour, and seemed natural, except that the outer margin of the left was a little indistinct.

The view originally taken as to the nature of this little patient's cerebellar disease was thus expressed:—“The history and mode of onset make it seem most probable that in Jessie J— some slight traumatic or concussion lesion occurred at the time of the accident, and that gradually some irritative or sub-inflammatory change was set up at the original seat of lesion (whether this was a mere superficial bruise or some internal small extravasation of blood), which finally led to the production of a small abscess. After a time its increase was checked, and after a still longer time (coincident with the great improvement in the patient's condition about last Christmas) its contents began to be absorbed. Now, we may have a mere shrunken cyst-like cavity, and it is to be hoped that in time the last symptom of disease may disappear, and the patient's mode of walking may again become quite natural.”

This, therefore, is an interesting example of complete recovery from an affection of the cerebellum, which was so severe that for weeks a fatal result seemed almost inevitable.

The younger child, Ada B—, aged five years, presented from the first symptoms of a more chronic order, which have since gone on to a fatal termination. Here an autopsy enabled us to verify the original diagnosis, as to the existence of a tumour in the middle lobe of the cerebellum. This child fell backwards off a rather high table, about the end of March, 1877, and thus struck the occiput severely. No immediate symptoms were produced except a certain “dulness of manner,” for the first week or two, and this was followed after a month by startings in sleep, and transient attacks of vertigo during the day. These objective and subjective signs were succeeded in a few weeks more by frequent attacks of morning sickness, with occipital and cervical pains. Eight or nine months from the time of the accident, weakness in walking and a staggering gait began to be noticed, together with a slight indistinctness of speech—the attacks of sickness and occipital pain continuing. This child did not suffer from fits of any kind, nor was her sight noticed to be affected till about fourteen months after the accident. At this time she was found to have double optic neuritis; her sight thereafter gradually became worse, and the neuritis slowly gave place to an atrophic condition of the discs. Under treatment with iodide of potassium and cod-liver oil this little patient decidedly improved in almost all respects, as was shown by the last of the already recorded notes on July 18th. This improvement lasted about two months, when she again began to suffer more from some of the old symptoms, together with increased weakness; and shortly afterwards, on Oct. 9th, 1878, she was admitted into the National Hospital for the Paralysed and Epileptic under my care. From this date some notes concerning the further history of her case are given; and these, as the sequel shows, correspond in time with the progressive development of ventricular dropsy (or chronic hydrocephalus), occasioned by the increase in size of a tumour in the middle lobe of the cerebellum.

On admission careful notes were taken of this child's condition by the then resident medical officer, Mr. A. E. Broster, which are here given almost in full.

Present state.—Does not complain of headache; says she feels quite well. The mother says she has been complaining of pains in her right thigh (cried about it, and asked to have the thigh rubbed), but she has not done so since admission. Occasionally when moved, and often when lying at rest, cries on account of pain in her neck. Very restless by night, and seems to perspire profusely. Occasionally during the night screams as if in pain; she may scream three or four times in one night, and then go a whole week and not do so. Her mother does not think she has lost flesh; mental condition appears to be perfectly clear. Special senses: Sight dim, but is able to distinguish a watch, a penny, and big letters. She also recognises people, and apparently as well with one eye as with the other. As far as can be ascertained, she suffers neither from hemiopia nor from diplopia. No paralysis of muscles of eyeballs. Slight nystagmus. Pupils large, equal, and sluggish. Ophthalmology.