

reduplicated second sound over the pulmonary area. On Nov. 6th the liver was noted as being two inches below the costal margin. The cardiac dulness extended also over one inch to the right of the sternum. In addition to the systolic murmur at the apex a to-and-fro sound was heard at the base which Dr. Carpenter considered might be either endocardial or pericardial. The pulse was 140. Some œdema of the legs was present. On the 30th the basic murmur was still present and the pulse was still 140. The œdema of the legs was less. On Dec. 11th it is interesting to note that although the boy was in other ways worse the œdema of the legs had disappeared. He died on Jan. 2nd, 1906.

At the necropsy the body was found to be wasted. There was no trace of œdema of the legs. The heart was much dilated. It extended from the junction of the cartilages and ribs on the right side to one inch outside the nipple line on the left; it weighed 10½ ounces. The pericardium was perfectly healthy, except that a few small petechiæ were present over the back of the auricles. Nothing could be found to account for the basic murmur. The pulmonary and aortic valves were both competent to the water test and the cusps were free from thickening. The tricuspid orifice was much dilated; it admitted four fingers, but the cusps were healthy. The mitral orifice was also dilated; it admitted three fingers. The chordæ tendinæ were slightly thickened but not shortened. There was no deformity of either the large or the small flap. "Water-marking" of the interior of the left auricle showed that there had been regurgitation through the mitral orifice during life. The cardiac muscle was pale but to the naked eye there was nothing definitely abnormal. The liver extended three inches below the costal margin; on section it presented the characteristic nutmeg appearance. There was nothing noteworthy about any of the other organs except the lungs, which were dotted over with small circular petechiæ. Microscopical examination of the heart muscle showed a few fibres in which fatty degeneration was considerable and many others in which small granules were scattered throughout the fibres, but the amount of fatty degeneration was not greater than is frequently seen in death from almost any cause. There was little or no increase of interstitial tissue. The microscopical examination threw no light upon the nature of the hypertrophy and dilatation.

As has already been mentioned, the main morbid condition present was dilatation, associated with hypertrophy of the heart, and the question of the causation of this dilatation and hypertrophy presents itself for consideration, as it does in all cases in which valvular disease and general adhesion of the pericardium are absent. In adults there are several causes of such a morbid condition of the heart, but in children possibly almost the only cause is rheumatism. Symptoms of cardiac weakness appear to have occurred in this boy before swelling of the joints was noticed, yet the fact that rheumatism definitely had at one time been present strongly suggests that there had been also an earlier attack which had fallen mainly upon the heart.

The idea, however, that rheumatism, apart from valvular disease and general adhesion of the pericardium, can cause enlargement of the heart may appear fanciful. Let us consider for a moment, however, the enlargement which occurs in association with pericarditis due to rheumatism. In such cases not only dilatation but hypertrophy of the heart may be remarkably rapid. We have seen pericarditis develop in a girl, aged 11 years, while under treatment for chorea and cause death within a fortnight, at the end of which time the heart was more than double the normal weight for a child of that age, and such an event, which was noticed many years ago by Dr. J. F. Goodhart, is by no means uncommon. No other disease but rheumatism produces such a rapid increase in weight of the heart. It may be said that such rapid increase of weight must be due to imbibition of fluid. That may be so, but the heart does not return to a more normal size when the inflammation of the pericardium has subsided. On the contrary, the hypertrophy is generally progressive and the enlargement may become so great that even a child 12 years of age may possess a heart weighing 30 ounces. Barnard, Sequeira, and others have given a simple explanation for the dilatation of the heart in pericarditis. They consider that the pericarditis causes softening of the fibrous pericardium, which yields and allows dilatation of the heart. Hypertrophy follows this dilatation. If, however, softening of the fibrous pericardium were the explanation of dilatation

of the heart associated with pericarditis, the dilatation should occur not only in rheumatic pericarditis but in other forms of pericarditis. But in forms of pericarditis equally, if not more virulent, such as the suppurative pericarditis of pneumonia, or of pyæmia, little or no dilatation of the heart takes place. This absence of dilatation in suppurative pericarditis one of us (T. F.) has long pointed out in the post-mortem room and mentioned it in reply to Dr. J. H. Sequeira at a meeting of the Society for the Study of Disease in Children in October, 1900. It is interesting to note, however, that Dr. G. F. Still has since commented upon the same fact.<sup>2</sup>

Since the difference in degree of the dilatation of the heart which occurs in association with rheumatic pericarditis and in suppurative pericarditis is very great, it seems clear that the dilatation rests upon no such simple causation as yielding of the fibrous pericardium. It depends, we believe, upon something more subtle, upon a poisoning of the heart which affects it chiefly in this way during the growing period of life. After the age of 20 years rheumatic pericarditis causes little or no dilatation of the heart. Allowing, however, that the enlargement of the heart is due to rheumatic poisoning, it is nevertheless true that such enlargement is rarely seen to follow rheumatism unless pericarditis has been present. But this is not surprising. Pericarditis is, no doubt, an evidence of the most intense form of rheumatic infection of the heart, and to get infection which attacks the cardiac muscle while the pericardium escapes can hardly be expected to be common. It must also be remembered that some general cardiac hypertrophy is not uncommon in mitral stenosis. To explain hypertrophy of the left ventricle on mechanical grounds in mitral stenosis is not easy. It seems far more reasonable to allow that the hypertrophy is the result of some interference with the nutrition of the cardiac wall by the rheumatic poison. But however that may be, cases are undoubtedly to be seen from time to time of enlargement of the heart without valvular disease and without general adhesion of the pericardium in children who have suffered from rheumatism, and it is reasonable, in the absence of evidence of other causation, to attribute that enlargement to the rheumatism.

## OSSIFICATION OF THE FONTANELLES AND CLOSURE OF SUTURES AT BIRTH—A CAUSE OF DIFFICULT DELIVERY.

BY T. LEAHY-LYNCH, L.R.C.P., L.R.C.S. & L.M.  
EDIN., L.F.P.S. GLASG.

A PRIMIPARA, aged 33 years, with vertex presentation in the first position, who was in labour for the usual number of hours, completed the first stage normally. I ruptured the membranes and left the patient a reasonable time to complete the second stage, but she exhibited failing strength and asked for my help. She was very nervous, so I determined to send for my partner, Mr. R. J. Mackay, to give an anæsthetic and to deliver her with forceps. She was got well under anæsthesia and the forceps was applied, but the handles were separated when the instrument was locked. Delivery was much more difficult and took longer than had been anticipated. For this I endeavoured to find a cause. The third stage over, I examined the baby's head; there were no moulding, no overlapping of the parietals over the frontal and occipital bones, and no overlapping of the parietal bones themselves; there was no trace of a posterior fontanelle or of those at the anterior inferior angles of the parietals; there was a mere depression over the anterior fontanelle or bregma; the sagittal suture was closed as well as the frontal, the coronal, and the lambdoid. In fact, ossification was complete in the fontanelles and sutures. The child was a healthy male, 21 inches in length, and weighing eight and a half pounds. No hydrocephalus was present. The blade of the forceps marked the infant slightly over the left mastoid region. The mother displayed symptoms of puerperal insanity on the third day. She rambled, wanted to get out of bed, looked strange, buried her head in the pillow, took little notice of her surroundings, would

<sup>2</sup> Brit. Med. Jour., vol. ii., 1901, p. 606.

scarcely answer when spoken to, and would not take nourishment. She had diarrhoea, anorexia, and the breasts were empty. The temperature and lochia were normal. She was kept quiet and the baby was taken away; large doses of bromide of potassium and aromatic spirit of ammonia were given, after which several hours' rest were obtained and the symptoms quickly passed off. The breasts filled and the patient became quite well.

My object in recording these facts is to show that the shock of delivery must have been very severe for the patient. The text-books give little information on this point. Herman's "Difficult Labour" does not mention it. Galabin (p. 93) mentions that "the male head is more firmly ossified at birth than the female skull, is half an inch more in circumference; hence arises greater protraction of labour in the case of males, more frequent necessity for artificial aid, and greater mortality both to mothers and children." Cazeaux and Tarnier's "Theory and Practice of Obstetrics," vol. iii., p. 839, states: "To this cause, dystocia, our colleague and friend, Dr. Joulin, Adjunct Professor of the Faculty of Medicine at Paris, devoted a long chapter of his thesis for the Concours. According to him the Germans admit that trouble may be due to the size of the head alone, besides which they also call attention to a peculiarity of the ossification little known in France, which adds to the difficulty of the situation—viz., the development of Wormian bones in the fontanelles causing their solidification." "It is very hard to determine what ought to be done in cases of this kind; it is almost impossible to become aware of the size of the child whilst it is still within the womb, so that the practitioner who finds the progress of the case arrested in an apparently well-formed pelvis will very probably decide upon active interference before the true cause of the delay is detected and apply the forceps or cephalotribe according to the amount of difficulty which the size of the head shall present to its extraction" (Joulin). "The fontanelles at inferior angles of parietal bones close soon after birth. The posterior fontanelle closes in a few months, the anterior remaining open until the first or second year. Sometimes this fontanelle remains open beyond two years, and occasionally persists throughout life" (Gray).

I shall be glad to know if this condition is often met with and the best means of its diagnosis, as the guides to the fontanelles—viz., the sutures—were in this case closed.

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## A NOTE ON THE INFLUENCE OF ANTITOXIC SERUM ON THE TUBERCULO-OPSONIC INDEX.

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WHILE preparing a paper on the opsonic index, a paper which was read jointly with Dr. E. E. Glynn on May 3rd before the Liverpool Medical Institution and which will be published in full in the summer number of the *Liverpool Medico-Chirurgical Journal*, I made a number of estimations for the purpose of ascertaining for myself the fact generally accepted that the tuberculo-opsonic index is practically the same in all non-tuberculous individuals. On one particular day I determined the index of seven persons, free from all suspicion of tubercle, four medical men, two nurses, and a young man, D., in my ward who was recovering from an attack of neuritis, the result of diphtheria, for which he had been treated with antitoxic serum about three months before. The index of the first six worked out well within the accepted normal limits of variation but to my surprise the index of the patient was only half the average of the others. The following are the exact figures: Dr. B., 1.14; Mr. S., 1.05; Mr. C., 0.97; Mr. H., 0.96; Nurse A., 0.95; and Nurse B., 0.92; average 1.00. Patient D., 0.47. The other counts agreed so closely that I felt confident I had made no mistake in carrying out the estimations and I was inclined to suspect that the patient in question had some local tuberculous infection which I had not been able to discover. My late house physician, Mr. C. H. Smith, however, suggested that the low index might be a consequence of the inoculation with antidiphtheritic serum three months

before. One of his colleagues, Mr. W. Yorke, had noticed a marked depression of the tuberculo-opsonic index following the administration of a prophylactic dose of antitetanic serum given to a healthy man who had reason to fear he had exposed himself to the risk of inoculation with tetanus. To test the correctness of this explanation I took the tuberculo-opsonic index of eight other individuals who had been treated with antidiphtheritic serum. In three of the cases a second estimation was made after an interval. The following table shows the opsonic index in each case and the time which had elapsed between administration of the antidiphtheritic serum and the estimation of the index.

| No. of case. | Interval since the antidiphtheritic serum was administered. | Index. |
|--------------|---|--------|
| 1            | 2 days.   | 1.30   |
| 2            | 5 "   | 0.64   |
|              | 12 "  | 1.02   |
|              | 25 "  | 0.35   |
| 3            | 27 "  | 0.89   |
|              | 41 "  | 0.72   |
| 4            | 25 "  | 0.64   |
| 5            | 26 "  | 0.72   |
| 6            | 26 "  | 0.62   |
| 7            | 27 "  | 0.77   |
| 8            | 28 "  | 0.69   |
| 9            | 3 months.   | 0.47   |
| Average      | ...   | 0.73   |

It thus appears that in all the nine cases examined the tuberculo-opsonic index was found below the normal at some period subsequent to inoculation with antidiphtheritic serum. The depression seems to have increased for some time and in Case 9 to have persisted for months. Cases 1 and 2 suggest that the immediate effect of the inoculation is to raise the tuberculo-opsonic index but the data are too scanty to enable us to generalise on this point. It is obvious that it must be of the utmost importance to bear in mind the possibility of some such cause as was present in the foregoing cases before giving an opinion on the significance of a low opsonic index. As to the nature of the influence of the antitoxic sera, antitetanic as well as antidiphtheritic, on the opsonic index it is premature to offer any positive opinion. It is not unreasonable, however, to assume that it is due to some property inherent in the blood of the horse and has nothing to do with the specific antitoxins.

I have to thank my present house physician, Mr. G. L. Cox, for his assistance in carrying out the estimations.

Liverpool.

## EXTENSIVE RUPTURE OF THE LIVER WITHOUT EXTERNAL INJURY.

By F. SEYMOUR LLOYD, M.D. LOND.

AT 9.30 P.M. on May 1st I was called to see a brewer's drayman who had just been brought in by his companions and found him to be dead. As no one witnessed the accident it is impossible to say exactly how it occurred, but it seems probable that as the man was in the act of mounting to the box his horses started off suddenly and trying to pass a dray standing just in front of them squeezed his body between the projecting hoods of the two vans. The first intimation that anything was wrong was received by the driver of the first van who, surprised to find the second van starting before his own, looked down and saw it passing with the deceased hanging by the hands to the stays just below the hood. Immediately the dray forged in front, however, he let go his hold, regained his feet, and darted on to the sidewalk where he leaned against a parapet with his head on his left arm and his right hand compressing his abdomen. He appeared to be in great pain and made as if to vomit, but did not do so; after a little while he tried to pull himself together and said, "All right, mate, I'll drive