systolic, not presystolic, but if the heart were beating rapidly the exact time of its occurrence would not always be easy to ascertain.

Since the above was written Dr. Sturges has mentioned, in his lectures upon Heart Inflammation in Children, five instances in which a thrill and presystolic murmur were noted during life, while mitral stenosis was found on *post-mortem* examination to be absent. It is noteworthy that Dr. Sturges uses the words "thrill and presystolic murmur," from which we may infer that the thrill was not thought to be presystolic.

Dr. Cheadle has noticed the frequency of a diastolic sound in the early endocarditis of children, and states that, although it may disappear, it generally develops into the presystolic *bruit* of mitral stenosis.²

Possibly the diastolic sound that disappears, although indistinguishable at this stage from that of early mitral stenosis, may indicate temporary dilatation of the heart. The sound heard in the diastolic interval in association with a dilated heart may be either a sound separated by an interval both from the second or the first sound, or it may be a low-pitched presystolic rumble. As is well known, the presystolic *bruit* of mitral stenosis may often be replaced by a diastolic sound. The soft presystolic rumble of a dilated heart may also alternate with a diastolic sound.

The presystolic rumble of a dilated heart is, however, probably too low pitched to lead to much difficulty in diagnosis, and, when changed for a diastolic sound, the accentuation and rhythm may be that of the *bruit de galop*. There is, however, a diastolic murmur heard in the dilated heart of children which is presumably due to that dilatation, and is indistinguishable from the diastolic sound of mitral stenosis. It may be best heard at the impulse or just outside it, or over the right ventricle in the third and fourth or fourth and fifth intercostal spaces. In one position it is probably produced in the left ventricle, in the other in the right. In the same heart it may sometimes be best heard in one position, sometimes in the other, and then probably points to general dilatation.

Whether such a murmur indicates mitral stenosis or dilatation of the heart is of some importance. Adherent pericardium is the most common cause of a dilated heart in childhood, and death from such a cause is far more common than from mitral stenosis. Thus the *post-mortem* reports at Guy's for seven years showed that there were only 3 deaths from mitral stenosis of the age of 15 years and under, while there were 13 deaths from cardiac disease with adherent pericardium, in which valvular disease was either absent, or there was merely slight thickening of the mitral valves. Apparently very few children with adherent pericardium survive the age of fifteen, while mitral stenosis is not uncommon in young adults. This suggests that the immediate prognosis is considerably worse in the former affection. A diastolic sound, therefore, indicating persisting dilatation of the heart, is probably of far more serious import than one pointing to mitral stenosis.

A CASE OF SENSORY APHASIA, ACCOMPANIED BY WORD DEAFNESS, WORD BLINDNESS, AND AGRAPHIA.

By HARDING H. TOMKINS, M.R.C.S., ETC.,

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I AM indebted to my brother, Mr. Alfred J. Tomkins, of Brighton, for many notes and permission to publish the following case:

Past History.—A. N., aged 40, tailor, had had a slight tendency to hæmophilia from youth. In November, 1890, and again in February, 1892, he had slight hæmoptysis, probably from a varicose vein, visible in the pharynx. In April, 1892, he had slight hæmorrhage from urethra after coition (seldom practised for some time previously). He had been something of an athlete and boxer, had lived freely, and still drank beer freely and smoked perhaps to excess. There was no history of syphilis. He had suffered much mental anxiety and business worry due to the recent death of his brother (head of firm), and consequent frequent journeys to London by early train, great activity while there, often without food, resulting in exhaustion on returning to Brighton in the evening. The general health was good, but he was somewhat obese and plethoric in

appearance. The heart was hypertrophied, and the second sound accentuated and slapping in character. The pulse was tense, rapid, and powerful.

Attack.—Having felt specially well and bright that day (July 24th, 1892), he was conversing quietly about noon when he suddenly became unable to recollect words. Feeling bewildered and somewhat faint he sat down for a while, but getting worse, and becoming excited in consequence of his inability to make those around him comprehend his meaning, a friend took him nearly home. He then walked on to my brother's house. He next went home, a few hundred yards, and lay down. About an hour after he was visited by my brother, who found that a patch of subconjunctival hæmorrhage had developed at the outer canthus of the left eye. The patient was entirely unable to converse, using wrong words and frequently only syllabic sounds, not real words; he had some pain in the left temple. Deeming it inadvisable to excite him, no further examination was made. Between 1 P.M. and 11.30 P.M. he vomited twice, had free evacuation of the bowels, and passed urine copiously. He was given bromide of potassium and chloral hydrate, and had a fairly good night.

On July 25th he was mostly drowsy, at times excitable and irritable, and complained of pain in the left occipital region. Urine, $\frac{1}{2}$ albumen, clear, no blood.

On July 26th he was quieter. Bowels and urine as before.

On July 28th he was very restless, and thought himself well enough to go to work; however, he could not understand anything said to him without pantomime (for example, told to put out his tongue he offered his hand, though the pulse had just been taken); he could not whistle to accompaniment (a favourite pastime); could not write to dictation, but when told to write "Wednesday, August 10th, 1893," wrote words most letters of which were intelligible, but which were simply jargon in them-

Fig. 1.

selves, as is shown in the reproduction (Fig. 1); some time soon after this he wrote his name fairly well when practising alone. He could not read at all, but used such sounds as "todibeg," "coweid," "wiz," and "schloth"; he could not name his children except the eldest, and could not make himself understood without a good deal of pantomime, as he was unable to compose a sentence, and generally used unintelligible sounds for words. He was ordered liq. hydrarg. et sodii iodidi.

From this time onward the albumen decreased to practically *nil*, with an occasional trace, as on August 17th.

By July 31st speech was improving slowly, and urine decidedly less albuminous.

On August 4th, happening to visit my brother, we went to see him, and by ophthalmoscopic examination I found both discs slightly too red, vessels distended and edges of discs slightly but distinctly blurred. No recent or old hæmorrhage or other abnormality; as far as could be ascertained no defect of vision and no hemianopsia; could certainly see small type, though unable to read.

On August 10th, word deafness was less marked, but he did not always interpret well. Word blindness was present. He could not name a child, nor recognise a picture of a fowl or donkey, but called the picture of a little girl "a kid."

On August 11th he could copy the figures in items of a bill for a suit of clothes, and add up correctly. The biniodide was stopped and he was given iodide of potassium gr. v.

On August 17th he talked better, complained of bloodshot eye. Urine which had become normal, now contained albumen; pulse hard, 100.

On September 1st he went to Barcombe for change, as it worried him to try and talk to friends. Previously to this he had regained the power of whistling, and also volunteered that a geranium ought to be taken away as it "had no pictures" (flowers).

During September he steadily improved, having regained the power to read to some extent with difficulty; could spell out meaning of advertisements on hoardings, but books soon tired him too much to continue; could name his children, but always said "he" for "she," though unaware of this habitual error; memory for articles and pictures was perfect, and by September 30th he wrote spontaneously one of several letters (Fig. 2).

Fig. 2.

² Keating's *Encyclopedia of Diseases of Children*, vol. ii, part ii, p. 777.

On October 2nd he discussed a letter and afterwards copied correctly a reply.

On October 4th he wrote a short letter, well worded, correctly punctuated and spelt, in his usually good business hand, with only one error in spelling. He could understand speech well without pantomime, and talk intelligibly, only substituting words occasionally, then saying "Am I talking nonsense?" He however complained frequently of "crashing noises" in his head, which were also excited by rattling of knives, etc.

About two hours after writing this last letter, he had at 10 P.M. a somewhat violent convulsive attack; falling unconscious, he remained so for about thirty-six hours (his friends thought the convulsions bilateral, but there is some doubt). After this attack, though too weak to attempt to write, he regained his speech to a greater extent than before the attack.

On October 12th, about 8 P.M. (having been comatose since the second attack), he suddenly pressed his hand, it is said, over the region of his left kidney, with a cry as of acute pain, and became quickly comatose; convulsions followed, and lasted more or less all night, but were not violent as before. He remained comatose till death, about 8 P.M. on October 14th.

There was no *post-mortem* examination, but I am inclined to think the symptoms were due to hæmorrhage from or about the posterior terminal branches of the middle cerebral artery supplying the superior temporo-sphenoidal and superior marginal convolutions. (A somewhat similar case is reported in Suckling's *Diagnosis of Diseases of the Brain*, but due to embolism.) That it was hæmorrhage is almost certain from the previous tendency to bleeding, from the tense rapid pulse, the absence of heart disease other than hypertrophy consequent upon chronic kidney disease, and the immediately preceding mental strain, excitement, and bodily over-exertion; added to which is the fact that, though the onset was sudden, yet the first symptoms appear to have been faulty word memory, indicating a small lesion affecting the superior temporo-sphenoidal convolution; and as the mischief spread, the symptoms became noticeably more, till at last he could neither speak, recognise spoken or musical sounds, read or write to dictation, recognise familiar objects, or copy writing—though it is possible he may have retained the ability to sign his name.

Regarding the reading, in his case the difficulty was twofold, for the peculiar sounds uttered seem to be diagnostic of word deafness, while that he was certainly word-blind also is shown by his inability to recognise pictures or written directions, and the fact that when getting better he still had to learn to spell out advertisements by means of capital letters chiefly. Dr. Broadbent records an interesting case in which a word-deaf patient read aloud: "So sur wisjee coz wenement apripsy fro freuz fenement wiza seconce coz foz no sophias a the freckled pothy conollied." Dr. Ross, on the other hand, reports a case of a word-blind patient, who for "Dear Sir, I shall be much obliged if you will let me know whether or not you consider it likely A. B. will recover," read as follows: "Dear Sir, you are requested to bring this note with you next time you come to the infirmary."

An additional argument in favour of hæmorrhage exists in the fact that after lying down for some time a subconjunctival hæmorrhage appeared, as if from soaking of the fluid blood along the course of the middle cerebral artery, and thence into the connective tissue of the orbit on the side of the lesion. That it was a cortical lesion is probable from the local pain, the vomiting, the absence of unconsciousness, the absence of any definite motor paralysis, except perhaps some paresis of the muscles of the tongue interfering with whistling, though the chief interference was due to inability to interpret the sounds correctly; the centre for this organ is in close proximity to both the centres for hearing and for sight, since some authorities still hold that the centres in the occipital lobes are not the only visual centres, but also those originally mapped out by Ferrier in the supramarginal and angular convolutions. Professor Ranney, of New York, gives a diagram in his work on nervous diseases showing associating fibres between the speech centre and those of hearing and those of sight (occipital lobes), and between the speech centre and the medulla, and also between the hearing and sight centres; now as these apparently, and the second or speech tract certainly, pass antero-posteriorly close to the surface of the hemisphere (Wernicke), one is tempted to think that pressure on and consequent irritation of these would account for symptoms of word blindness, even supposing the supramarginal sight centres to be only motor. If, then, a small artery supplying the hearing centres ruptured, there seems to me every reasonable chance of the effused blood interfering either with the ad-

jacent sight centres in the supramarginal convolution or with those associating fibres, or possibly both.

THE STAINING OF THE FLAGELLA OF BACTERIA.

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To present to our view all the morphological features of a micro-organism it is necessary to determine the form of the cell body of the micro-organism and especially in the motile species to determine also the presence or absence of flagella. In the ordinary methods of staining bacteria the cell body alone is shown. Several methods have been formulated by which the presence and character of flagella may be demonstrated. The principle underlying all these methods is the same, namely, to act upon the substance of the flagella by means of a mordant, so that these may take up a staining material which when used by the ordinary methods fails to stain them. Methods have been formulated by Koch,¹ Küntler,² Neuhaus,³ Trenkmann,⁴ Loeffler,⁵ Lubsch,⁶ Van Ermengen,⁷ Rémy and E. Sugg,⁸ Klein,⁹ and Nicolle and Morax.¹⁰ The method of the last-named observers is a rapid and effective means of staining flagella. The difficulty to overcome is the precipitation by the mordanting process of foreign substances, which, taking on the stain, obscure the stained flagella. This precipitation they seek to obviate by the following method:—

They rub in a watchglassful of ordinary tapwater a paticle of a recent agar culture of the micro-organism, so that no large particles remain. By means of a pipette, a thin film of this mixture is made on a coverglass held in a Cornet's forceps, and previously strongly heated and allowed to cool. The film is protected from contamination and allowed to dry at the ordinary temperature. A few drops of the mordant are then placed on this film. The mordant is composed of 10 c.c. of 20 per cent. solution of the purest tannin; 5 c.c. of cold saturated solution of ferrous sulphate; 1 c.c. saturated solution of fuchsin in alcohol. The cover glass is then warmed over a flame for twelve seconds, so that the liquid just steams, and it is very important not to heat too strongly or too long. The coverglass is then washed gently but well in a stream of ordinary water. The points of the forceps and the upper surface of the coverglass are then well dried, and the mordant used twice or thrice again in exactly the same way. Too little mordanting shows the bacteria without flagella, too much mordanting precipitates foreign matters and obscures the flagella. Generally three mordantings enable the flagella to take on the stain better than the background. The staining proper may be effected by creasoted or anilin fuchsin, anilin gentian violet or gentian violet. They use Ziehl's phenol-fuchsin. A few drops of the stain are heated on the coverglass in the flame as before for fifteen seconds, and then washed as before. They repeat the staining if they suspect "undermordanting." Then the coverglass may be examined when dry.

By following the clear instructions of these observers and staining with Ziehl's reagent, I obtained good staining of the flagella in the cases of the spirillum Finkleri, sp. Deneke, sp. Metchnikovi, sp. cholerae Asiaticæ (one from Koch's laboratory and three isolated by Professor Delépine¹¹ from Manchester cases), a spirillum somewhat like Finkler's isolated recently from Manchester sewage, the bacillus of typhoid, and B. coli communis. Well stained flagella of the last-mentioned spirillum, of the sp. Deneke, and of B. coli communis were obtained by diffusing in tap water a twelve hours' drop culture in bouillon, and this method may prove useful if the bacteria do not readily separate from each other when agar cultures are used. The results are not uniform over the whole of the specimen; the ground is, as a rule, very darkly stained, but here and there the bacteria stand out well stained on a clear background.

The method may not be so suitable for photomicrographic purposes as Loeffler's and Van Ermengen's, but for rapid work this is the best method hitherto described. In the spirilla mentioned above the separate segments had each one flagellum situated at one end. Occasionally strings of spirillar segments were seen, the cells being apparently joined by means of their flagella. This recalls the appearance seen in drop cultures of these organisms, in which a single segment follows at a short interval all the slow movements of a spirillum across the field of view, the segment having apparently some attachment to the spirillum, whilst surrounding free segments have a rapid darting motion.

These observations agree with those of Nicolle and Morax