REMARKABLE CASE OF HEART DISEASE:

SEPTUM OVALE OPEN, AND INFERIOR VENA CAVA
OPENING INTO LEFT AURICLE; NO CYANOSIS.

By ARTHUR E. T. LONGHURST, M.D.,
4TH BATT., 60TH RIFLES.

THE subject of this very singular case was a man with a well-built frame, good muscular development, and 5 ft. 4 in. in height. At the age of nineteen he enlisted into the 60th Rifles, having been for seven years previously in the Royal Navy, and was in possession of the Baltic medal for services on board H.M. frigate *Nile* during the Crimean war. He embarked with his battalion for Canada in June, 1861; and, without being habitually intemperate, he kept up his habits of sea life, taking stimulants pretty freely. His father died young, cause of death unknown; but he said his family were healthy, and his mother, who was with him constantly for some time before his death, was certainly a very healthy-looking old woman. He enjoyed good health in Canada, being always considered a strong, muscular little man, ready for anything, and was for three summers employed as one of a boat's crew on the river St. Lawrence and Lake Ontario, in the service of the General Officer commanding. He had a mild attack of syphilis in 1868, not treated by mercury, and not followed by secondaries; and returned to England with his battalion in the summer of 1869, in good health, going through field days at Aldershot and the autumn manœuvres for three seasons without inconvenience. Was tapped for hydrocele in 1872, and in December of that year was in hospital for gout in the right foot, being at times dyspeptic, but never had acute rheumatism.

He came to hospital on Oct. 16th, 1873, complaining of extreme weakness amounting at times to syncope. He looked very ill, was deadly pale, respiration rapid and laboured, heart's action extremely quick and extended, with regurgitation into the veins at the base of the neck; legs œdematous. Auscultation revealed pulmonic congestion, especially of the left side, and extensive valvular disease of the heart, the exact nature of which could not be at once determined owing to the very rapid action—144 a minute, with weak and irregular rhythm. Having for some months been employed as clerk in the battalion orderly room, he had not been called upon to undergo much exertion and fatigue, but said that for the last few months he had been subject occasionally to dyspnœa, and that since arrival at Portland, in June, the dyspnœa had increased with increasing debility, making it difficult for him to ascend the hill to the citadel, a height of nearly 500 ft. from the sea level. He was ordered a purgative, counter-irritation to back of the left lung, diaphoretic and digitalis. The symptoms were relieved; and on the 18th, two days later, a systolic bruit was heard just below the nipple, carried downwards, and very extensive cardiac hypertrophy was diagnosed, dulness extending towards the xiphoid cartilage and epigastrium, with giddiness and a confused, uncomfortable feeling in the head. Urine acid, depositing lithates, and slightly albuminous.

Oct. 24th.—Pulse irregular, three rapid beats and then a pause; respiration 24, easy; no cough nor expectoration, but some gouty pain in the knee.

25th.—Had a sudden attack of extreme dyspnœa, passing into a state resembling the clonic stage of an epileptic fit, but ending in coldness and exhaustion; and was considered due to pulmonary embolism. Ordered brandy and digitalis, under which the symptoms subsided to some extent; and on the 26th the pulse intermitted less frequently.

28th.—Sounds of the heart distinct and without bruit; impulse forcible, and widely extended upwards and to the right.

A fortnight later the pulse was down to 100; the sounds of the heart were clear and without bruit, but intermitting, three rapid beats and then a pause in length of two beats; the pulse at the wrist not corresponding to the heart in number of beats.

At the end of a month the rhythm was still irregular, pulse 132, respiration 32, the dropsy increasing. Digitalis continued. By Dec. 6th the frequency of the pulse fell to

74, but the intermission continued about every third beat. The digitalis was omitted, and the pulse again rose from 100 to 144.

On Dec. 15th the sounds of the heart were rather muffled and running into each other, but there was no bruit. On the 20th the sounds were quite regular, but there was a roughness with the diastole, and the pulse was 140.

From this date the general symptoms advanced rapidly, especially the dropsy, necessitating paracentesis abdominis on Jan. 4th, 1874, when two gallons of clear yellow serum were drawn off, with much temporary relief; but the abdomen soon refilled, with an accession of all the symptoms. No marked change, however, occurred in the heart sounds, which continued regular, quick, and feeble, without bruit. The operation of paracentesis was three times repeated with relief, but the patient grew weaker, and sank on Feb. 19th, four months from date of admission, his age being thirty-six.

Autopsy, twelve hours after death.—Body of a marked icteric hue, not at all blue or venous in appearance; upper half wasted, lower half œdematous. Abdomen much and uniformly distended, but without enlarged veins. — Thorax: Muscular coverings wasted; cartilages of ribs ossified. Right lung forced upwards, much congested, and intimately attached to the side by old adhesions. Left lung in a similar condition, but atrophied, and occupying only the mere apex of the thoracic cavity; the remainder of this space being occupied by an immensely hypertrophied heart, enlarged from above downwards, the shape of a distended stomach with a slight constriction across the left third, weighing, with adherent pericardium, attached vessels, and blood-clots, 2 lb. 9½ oz., and clear of these 2 lb. 1¼ oz. The right auricle, being laid open, was found extremely dilated and full of dark jelly-like clots. The superior vena cava opened into the appendix, and was also dilated; the foramen ovale was only partially closed, there being three crescentic openings, the size of a pea, in the lower border of the septum, each having a raised and well-defined margin, giving to the septum at this point a cribriform appearance. The opening of the inferior vena cava was absent; the coronary vein was extremely enlarged; the Eustachian and Thebesian valves were well marked, and the diameter of the auriculo-ventricular opening was 1.67 in.; the lappets of the valves were thickened, puckered, and imperfect. The left auricle was dilated, full of jelly-like clots, and having, in addition to its ordinary opening, that of the inferior vena cava, and at a point posteriorly and inferiorly and on the same plane, but posterior to the mitral orifice; the direction of this opening being clearly towards the cribriform septum ovale, whilst the pulmonary veins opened into the auricle superiorly, and their direction was towards the mitral orifice, the diameter of which was 1.45 in., and its valves were normal. The right ventricle was full of the same jelly-like clots, but did not offer any point for special notice; diameter of pulmonary artery, 1.18 in. The left ventricle formed the greater part of the entire weight of the heart; its apex being prolonged through a wide mouth into a large sacculated aneurism, the size of an ordinary orange, which was filled with layers of laminated fibrine; the external ones honeycombed and dense, the interior ones lying next the cavity of the ventricle being softer masses and without determinate form and character. The ventricular walls were slightly thickened, but prolonged for a short distance into the aneurismal walls, the limiting membrane of the main dilatation being composed of the adherent and thickened pericardium, on the outer edge of which was a bony plate or spicula, the result of tissue degeneration. The aorta was thin and flabby; no atheroma observed. Diameter of aortic opening, 1.03 in. Valves healthy. No fibrinous clots in the heart or great vessels. — Abdomen: Liver rounded and contracted on its surface; capsule densely thickened; weight 2 lb. 7¼ oz.; tissue presenting an excellent example of cirrhosis. Kidneys small and contracted; two cysts in the cortical substance of the left, lined by a distinct membrane, and containing a serous-looking fluid, with a depressed, yellow, cheesy-looking spot, found on section to extend inwards to the base of the pyramid, its exact nature being uncertain, but like the remains of the wall of a cyst such as that noted on the surface. Some serum and flaky lymph in the cavity of the peritoneum. Intestines distended and inflamed, and some of the intestinal convolutions glued together by recent lymph.

Remarks.—A consideration of the following points in this very remarkable and apparently unique case will, I think, be full of interest, and perhaps enable us the better to understand it.

1. The changes in the anatomy of the heart: (a) congenital; (b) structural, as the result of disease, or of both causes combined.

2. The changes in the adult circulation.

3. Perfect health and vigour up to thirty-five years of age.

4. The absence of cyanosis.

5. Absence of physical signs of congenital change.

6. Their comparative significance and variableness during the last few months of life, whilst under observation.

7. The determining cause of the aneurism.

1. The congenital changes, then, were as follows:—(1) Superior vena cava opening into the appendix of the right auricle, which, together with the auricle itself, was extremely dilated. (2) Absence of the inferior vena cava from the right auricle. (3) A cribriform condition of the septum ovale. (4) The extremely large size of the coronary vein. (5) The inferior vena cava opening into the left auricle, in the position and manner detailed.

The disease changes were:—(1) Adherent pericardium. (2) Dilatation of cavities of the heart. (3) Thickened and puckered state of right auriculo-ventricular valve. (4) Thickening of left ventricle walls, which were prolonged for a short distance into (5) a large aneurism of the ventricle. (6) Increase in weight of heart, to 2 lb. 1½ oz.

2. The changes from the ordinary course of the adult circulation were as follows:—The blood of the lower half of the body brought by the inferior vena cava, instead of passing into the right auricle direct, was carried first into the left, thence probably through the cribriform septum ovale into the right auricle, establishing thus a double current in the left auricle, composed of (a) venous blood, brought by the inferior cava for passage through the cribriform septum ovale into the right auricle, there to mingle with the stream from the superior cava passing into the right ventricle, thence into the lungs; and (b) arterial blood brought from the lungs by the pulmonary veins for passage into the left ventricle, thence to the aorta.

A consideration, then, of the above two conditions—viz., the changes in the anatomy of the heart, and the changes in the course of the circulation—may help us; but for a full and clear explanation of the case we must revert to the conditions of foetal life.

It is, I think, evident that a communication between the two auricles through the septum ovale was a necessary consequence of the inferior cava opening into the left, otherwise the two currents of venous and arterial blood must have mixed freely. Again, the points of openings of the vessels and their directions, the alteration in the size of the chambers, &c., would materially influence the currents—e. g., the site of opening of the inferior cava and its direction towards the cribriform septum, and the openings of the pulmonary veins in a direction towards the mitral orifice, might enable the blood currents in the left auricle to pass each other without very greatly commingling; there must, however, have been some slight admixture of venous and arterial blood in the left auricle, although apparently very small, from the absence of cyanosis; for granting that the blood currents from the inferior cava passed into the right auricle through the septum ovale, yet, on the contraction of the right auricle, some venous blood must have regurgitated through the opening into the left auricle, although the major part of it may have gone into the ventricle in the ordinary course.

I have said, however, that we must look to the conditions of foetal life for a complete understanding of the case, and those conditions will, I think, render it pretty clear; for we know that during the very early development of the foetal heart there is but one auricle, which subsequently becomes divided by the development of a septum; and that though for a time the inferior vena cava does open direct into the left auricle, yet that with increasing growth and development the septum rises up on the left side of the entrance of the vein, and thus causes it, together with the superior vena cava, to open into the right auricle. We see, therefore, that the peculiarity in the present instance is really a remnant of very early foetal life, yet that during that stage of foetal development the course of the blood was from the right to the left auricle; whilst in the case

under consideration, in adult life, the course of the stream was reversed. That such a condition should have continued into adult life, and that the subject should have enjoyed perfect health and strength, is not the less remarkable any more than that the course of the circulation, thus altered, should have flowed so evenly.

With regard to the conditions Nos. 3 and 4 noted, and referring to the health and constitutional vigour enjoyed by the subject, and the absence of cyanosis, it is, I believe, generally considered that the imperfect development which results in a direct communication between the two sides of the heart gives rise either to palpitation, dyspnoea, and an enfeebled existence, or to very early death; yet the subject in the present case was unusually strong and muscular, as stated, being known amongst his comrades as the little lion of the battalion, of free habit of life, and always ready for anything; and that he should have exhibited no sign of cyanosis is equally remarkable, unless the fact of the inferior cava opening into the left auricle in a line with the apertures in the septum, and so directing the current of the blood, may be sufficient to explain its absence; whilst we cannot here fail to be struck with the infinite power, wisdom, and skill by which Nature adapts herself to circumstances; or, in other words—if, indeed, we may venture to consider her as capable of error—how easily, having got into a difficulty, she rights herself; for surely, as above suggested, having put the inferior cava into the left auricle, she then left the septum ovale open, intending thereby, or in that way, to complete her form of creation, and to fit the creature for the work of life.

A consideration of points 5 and 6, as to absence of physical sign of patent septum ovale, is also surprising, a loud superficial murmur being usually heard over the site of the communication; but in the various examinations through which this subject had passed from time to time during a period of fifteen years' service nothing abnormal was ever detected, whilst its absence seems to prove that the passage of the blood through the cribriform septum into the right auricle was tolerably smooth and even, and the variableness and comparative insignificance of the physical signs of disease whilst under observation during the last few months of life was singular enough.

The physical signs on admission into hospital indicated a diseased condition of the tricuspid valves allowing of regurgitation, whilst percussion declared the hypertrophy, and both these conditions were realised in the post-mortem examination. As disease progressed the pulse became irregular, that at the wrist not corresponding to the beats of the heart either in force or frequency, whilst the tricuspid bruit disappeared entirely; and the fits of dyspnoea, with symptoms apparently due to pulmonary embolism at times observed, seemed fairly attributable to the altered condition of the heart and its valves as the result of disease quite irrespective of the congenital changes.

Lastly, as regards No. 7, the determining cause of the aneurism. Was it a strain in rowing, or some other act of over-exertion; tissue degeneration in the muscular structure of the ventricle in a man of free habit of life, of a gouty diathesis, having a bony plate or spicula on the limiting wall of the aneurism; or could it be at all of a congenital nature, originating partly in deficiency, more or less, of the muscular layers at the apex, or to changes in the force or direction of the blood-currents, consequent on the patent foramen ovale and other congenital irregularities?

The microscopical examination of the structure of the left ventricle walls by Dr. Welch, Assistant Professor of Pathology at Netley, and who, in conjunction with my valued friend and brother medical officer in the battalion, Dr. Harman, has so kindly aided my attempt towards a clear report of this very interesting and unusual case, failed to detect syphilitic or other precise tissue degeneration. Hence Dr. Welch is disposed to attribute the aneurism to some congenital deficiency in the muscular layers at the apex of the ventricle, where they are always the thinnest; but I incline to the belief that, with any congenital defect there, adult life would not have been reached, or if reached, the subject of such defect would not have been what he was in the present instance.

Consequently, though the microscope did fail to detect tissue degeneration, as there was an ossified state of the ribs, a bony plate on the pericardium, a diseased tricuspid valve, cirrhosis of liver, and contracted and diseased kidneys,

showing that tissue-change had for some time been going on in the ribs and other viscera of a man who had been addicted to the free use of spirits for years—itsself always so pregnant a source of tissue degeneration,—both Dr. Harman and myself are disposed to attribute the aneurism to a strain in rowing, or some other violent exertion, by which a weak point in the ventricle was established, and which eventually yielded to subsequent pressure and tissue degeneration, and that at most the congenital condition of the ventricle and the anatomical changes in the heart were only secondary causes in operation.

Verne Citadel, Portland.

TYPHOID FEVER THE RESULT OF INSANITARY CONDITIONS.

By ANGUS MACKINTOSH, M.D.,

MEDICAL OFFICER OF HEALTH, CHESTERFIELD.

As all professional men are not yet agreed on the real cause of typhoid fever and its *modus operandi*, it will be interesting to know any new circumstances that may favour or retard the poison or infection of this type of fever. I have reported elsewhere my belief that typhoid fever in every case is the result of a specific poison being introduced into the system, either through the medium of air or water, but I have yet to be convinced that the virus which causes this condition must be conveyed from one typhoid patient to another. The following case, which happened in my district ten weeks ago, is, in my opinion, an extremely strong one against the latter theory, and consequently worthy of being recorded.

About the end of December, 1873, a collier, with wife and four children, moved from the parish of Great Barlow, in the Chesterfield Union, to Long Row, Northwingfield, in the same Union, a distance of eight miles. Great Barlow is a rural parish and thinly populated; the population in 1871 was 959. So far as known to me, there has been no fatal case of typhoid in the parish for years, and none fatal or otherwise for the last nine months, during which period I have been acting as medical officer of health for the district. The house in which this man lived was an isolated one, and the conditions surrounding it, in a sanitary point of view, were very fair, so that, so far as can be traced, there was no chance of any poison or infection being conveyed with the man, wife, or family from their former home.

Long Row, to which the man, &c., went, consists of about thirty houses, and is also in a rural parish. Scarlet fever and measles have been lurking about the place more or less for the last six months, but there has been no case of typhoid or enteric fever in the Row for a considerable time. The house this man chose for his residence is about the middle of the Row, was previously occupied by a healthy family, and, so far as is known, there has been no enteric fever in it. The newly-arrived family used the same drinking-water as the rest of the inhabitants, which is procured from a well in a field about a quarter of a mile distant, and similar insanitary conditions as to sewage emanations surround each house, the privies and ashpits being at the same distance from every door in the Row. The drainage system, which is very imperfect, consists of an open surface-drain in front, and a trapped drain two yards from each house behind. The houses are of modern construction, and have through ventilation.

The new-comer was only about three weeks in this place when three of his boys were attacked with typhoid fever; the youngest, eight years old, was the first seized, then the other brothers; then their sister of twelve; after a few days the mother, and a fortnight later the father. Not one in the house escaped, and up to this date, when the family is quite convalescent, no other resident in the hamlet has caught the infection. Every precaution was adopted, and plenty of disinfectants freely used.

These facts would go to prove the following conclusions:—

1. That the family was free of the infection of typhoid fever when they came to the Long Row.

2. That the constant exposure to sewage emanations ap-

pears to protect the system in some degree against the effects of typhoid virus.

3. That, in some instances, individuals after a change of residence from a healthy locality to one favourable to typhoid fever are more susceptible to the poison than those long resident in it.

4. That the sewage emanations in this place were no doubt the cause of this attack, and that the stage of incubation was from fifteen to twenty days.

5. That sewage emanations are sufficient to create and produce typhoid fever, though not contaminated with the discharge of typhoid patients.

6. That unless the virus was totally destroyed by means of the regular system of disinfection carried out, this case would not go to prove the contagious nature of typhoid fever.

I may add, that since the beginning of 1874 I have had twenty cases of typhoid fever in my district, and not one of them could I trace to the presence of typhoid discharges in the water, or the effluvium proceeding from typhoid evacuations; and, what is very singular, two cases have not occurred in the same place (with the exceptions of the family above-mentioned); they were sprinkled over the district, and almost the whole were associated with sewage emanations and organic decomposition, and in some cases polluted water.

A Mirror

OF

HOSPITAL PRACTICE,

BRITISH AND FOREIGN.

Nulla autem est alia pro certo noscendi via, nisi quamplurimas et morborum et dissectionum historias, tum aliorum, tum proprias collectas habere, et inter se comparare.—MORGAGNI *De Sed. et Caus. Morb.*, lib. iv. Proœmium.

MIDDLESEX HOSPITAL.

CASE OF ENTERIC FEVER, WITH TYPHOID SYMPTOMS
PROLONGED INTO A PERIOD OF NORMAL
AVERAGE TEMPERATURES.

(Under the care of Dr. HENRY THOMPSON.)

THE following case is interesting in several particulars. It illustrates, for example, how a differential diagnosis may be made between typhus and typhoid fevers by regarding the history of the attack in those instances where the clinical manifestations are more or less equivocal. More important still, perhaps, is the evidence which this case seems to offer of thermometric defections. It is this phase of the question which Dr. Thompson has more especially discussed in the valuable remarks appended to the subjoined notes.

Edward B—, aged thirty-nine, a cabman, was admitted March 14th, 1874. Three weeks before admission he experienced a feeling of general malaise and languor, and thought he had a cold, but went on with his work as usual. Fourteen days before the same date he was compelled to keep his bed, shivered several times, and suffered from intense headache. During the three or four days preceding admission there had been twitchings of the muscles, and during the last two days delirium; but never at any time diarrhoea; on the contrary, the bowels had been constipated for six days.

At 7 P.M. on the day of admission the pulse was 144, the respiration 44, and the temperature 101.2°; complexion dull and earthy-yellow; marked nervous twitching of the hands and occasionally of the face; some degree of deafness; pupils small; tongue dry, brown, and fissured; abdomen mottled in appearance and greatly distended; no fever-spots of any kind; no tenderness; area of splenic dulness much enlarged; sonoro-sibilant râles throughout chest; looked livid in the face, spoke feebly, and coughed in a hoarse laryngeal tone. In the evening he passed urine in bed, jerked his knees about, and picked the bedclothes.

March 15th.—Lies in a state of profound sopor. There are sordes on the lips and much subsultus tendinum, with floccitation and carphology. Passed urine and four loose dark-coloured motions under him.—Morning: pulse 132;