

not on the stretch, but, on the contrary, is folded on itself. It atrophies, for it is never used; whereas the iris when attached to a wound near the centre of the cornea is always on the stretch. But attacked early, these peripheral adhesions are by no means difficult to treat, as will be seen by the following case.

A. B—, aged forty-two, was struck on the eye by a piece of metal, which produced a wound of the cornea, beginning at the outer edge at a point midway between the horizontal and upper extremity of the vertical meridian and extending vertically downwards below the horizontal. In this the iris was engaged. I tried to thrust this back by pressing it through the wound with the back of a knife, but in vain; so waiting a few days, I operated as I did in the case of Miss M—, thrusting the knife from below, insinuating it between the wound and the outer edge of the cornea, and then pressing the iris towards the centre. The iris was disengaged from the wound without being cut; the lips of the wound closed without escape of aqueous; and, with the exception to be noted, all soon became well. The exception was this: I found, a few days after the operation, that although all the pupillary edge of the iris was free from the wound, a little of the outer part of the iris was engaged in the upper end of it. However, the man found his eye quite free from trouble; he apparently did not share my anxiety to polish the matter *ad unguem*, for a hint at further interference was followed by his ceasing to attend. This "stroking out" of the iris without cutting seems to be a very valuable addition to our therapeutics, but its applicability is limited. I tried it soon after in a case which I shall next describe; but the eye was not stiff enough, for the attempt simply caused it to "buckle."

A boy, aged twelve, came with a wound of the cornea and sclera extending from a little outside the centre of the cornea in the horizontal meridian to a point about a line from the edge of opaque tissue. The iris was engaged in the whole length of the wound, and the lens was also cut. After the failure of the attempt I waited until the eye became firmer, when I operated as in the case of Miss M—. The attachment was so tough that nine operations were required for the complete severance of it. But the result well warranted the procedure, for every particle of iris was separated from the scar. As I have mentioned above, I tried to stroke out the iris, but there was not sufficient stiffness in the eye to afford counter-resistance. I now come to the last of the cases, one of which, I think, deserves to wind up the series.

A young gentleman, aged nine years, was brought to me by his mother on Feb. 18th, 1884. She stated that three years before he had accidentally been stabbed in the eye with a pen. I found a starred scar in nearly the centre of the cornea, to which all the iris, except enough at the lower and inner part to form a pupil, after free use of atropine, as large as a pin prick. The upper and inner quadrant of the edge of the cornea was so flattened by the piece of the imprisoned iris that at first sight the eye seemed hopeless. But I found after a prolonged examination that he managed with much oscillation of the eye and movement of the paper to make out No. 200 of Snellen, and I therefore decided to attempt to save the eye instead of advising its excision, as at first I was inclined to do. On the 23rd, assisted by Mr. A. Moir, after using atropine freely, I chloroformed the patient deeply, and then fixing the eye at the upper and outer part, thrust through the cornea at its outer edge, a little below the horizontal meridian, a narrow knife, fresh from the cutler, between the iris and the cornea, until the point was well beyond the inner edge of the adhesion; then by raising the handle and using the knife lever-wise depressed the blade against the tightened iris. To my delight the whole of the iris, except a minute bit at the lower and outer part, which indeed could not be influenced by the knife in this position, gave way. Atropine was freely used afterwards. The eye gave little trouble, although the boy suffered a good deal from the effects of the chloroform. This was due to his digestion being deranged, but the treatment to which he was subjected for this enabled him to bear three subsequent chloroformings without any trouble. He had now, instead of a pinhole pupil, a good sized one, and on March 6th, with a $2\frac{1}{2}$ + he made out a few of the letters in 20 Snellen. By this time we could see that the lens had been wounded, as indeed we had inferred. He was then sent home. On March 21st he read 15 Snellen, and on that day I divided the remaining bit of iris, using the knife as before, excepting that the eye was fixed below, and the knife

made to cut upwards. The pupil further dilated, and the reaction was so small that he was able to go home on the 27th. On April 17th he could spell 1.5 Snellen. I now could get a thorough examination of the pupil, when I found this condition:—After the first cut the inner central part of the iris had fallen on, and adhered to, the capsule of the lens; but that the upper was free. From the outer edge a filament of brown tissue extended to the scar. How this came about I cannot be certain; but I imagine the aqueous escaped, after the last operation, during retching, and that the edge of the iris became attached to the scar for a short time, and then receded as the aqueous was restored, leaving the spider-like thread of uveal exudation. I wished at the next operation to divide this, and to cut the capsule; but the knife was bad, and let out the aqueous as soon as I used it lever-wise. However, I found that I had divided the filament, and although I had not cut the capsule, I had disturbed it so as to let the pupil dilate considerably. On the 22nd his vision was $\frac{1}{3}$, and on the 29th $\frac{1}{2}$. On May 14th I made an incision in the capsule, and got a good-sized pupil, the operation causing no shock to the eye; on the 19th his vision was $\frac{1}{5}$ m., and Jaeger 1, and on the 24th $\frac{1}{5}$ m. Of course this case is exceptional, and one must expect few of such brilliancy. I think, however, I have shown that it is possible to give relief in a class of disease the formidable nature of which was well summed up by an ophthalmologist of the very highest repute on the Continent, who in reply to my telling him that I was in the habit of dividing anterior synechiæ, said, "You had better leave them alone; you will do more harm than good."

Finally, in performing these operations it is necessary to bear in mind these two axioms: first, you must make your corneal puncture at such a point as will afford the greatest sweep of the knife; and, second, that you should so manage the heel of the knife as to cause no loss of aqueous until the adhesion is severed. It is not always easy to decide beforehand whether a myotic or mydriatic should be used. One would think that for a central adhesion a mydriatic would be always the best, but in one case I failed twice to cut a central adhesion under the influence of atropine; whereas in a third attempt under eserine it gave way at once. Another point: the knife ought to be fresh from the cutler. I seldom attempt more than two or three such operations with one knife, which of course afterwards will do quite well for operations of inferior delicacy.

Liverpool.

CHRONIC CARDIAC ANEURYSM.

A CASE OF ANEURYSM OF THE WALL OF THE LEFT VENTRICLE AND OF THE MITRAL VALVE IN THE SAME SUBJECT.

By HENRY HANDFORD, M.D.

I MET with the following case in the post-mortem room of the General Hospital, Nottingham, in July, 1883. The patient had been admitted a few weeks previously under the care of Dr. Brookhouse. He was an iron moulder by trade, and had led a "roaming wild kind of life." There was no distinct history of syphilis or of rheumatism. He was thirty-six years of age, and was not aware that he was in any way ill till about a year ago. He had only been unable to work for about ten weeks. He had great dyspnoea, and oedema of both legs and of the scrotum, which latter was twice tapped with Southey's trocars and about twenty fluid ounces removed on each occasion. He had a systolic mitral murmur and a double aortic one. The diastolic aortic murmur was conducted best down the sternum and to the left, but was not heard at the apex. He complained occasionally of præcordial pain, but not very specially. He was only passing sixteen ounces of urine daily on admission, but the amount gradually increased up to forty-six ounces. He seemed to be improving considerably, but died suddenly in the night of July 2nd, 1883.

Necropsy, twelve hours after death.—Rigor mortis slight. Head, neck, and shoulders very livid. The pericardium contained about four ounces of clear straw-coloured fluid. There was a milk spot about the size of a shilling on the anterior surface of the right ventricle. Fibrinous, partially decolourised coagula were found in the cavity of the right ventricle and in the pulmonary artery. The clot in the pulmonary artery was not adherent to the walls of the artery.

There was a very small coagulum entangled in the mitral valve. The aortic valves were incompetent. The weight of the heart after it had been opened and its cavities thoroughly washed was twenty-eight ounces. The aorta was dilated and atheromatous, one or two patches becoming calcareous. The latter change was evidently only just commencing. The left anterior segment of the aortic valve was much thickened and indurated. The other two segments were not much altered. Between the left anterior and the posterior segments of the aortic valve, just at the base of aortic segment of the mitral valve, was a rounded opening, with a sharp fibrous margin, about the size of a fourpenny piece. It led into a cavity as large as a small walnut, which projected into the left auricle. The cavity was not lined with fibrin, and its walls consisted of fibrous tissue about one-twentieth of an inch thick. Between the right anterior and the posterior segments of the aortic valve was a circular patch the size of a sixpence, where the endocardium was softened and yellow; this also had a sharp fibrous margin, and was very slightly depressed. This was more evident on passing the finger over it, when the depression and the yielding nature of the patch, with its sharply defined margin, readily suggested a commencing aneurysm similar to the one on the other side. At the left border of the left (posterior or inferior) segment of the mitral valve was the opening of another cavity, very slightly smaller than the first, and also projecting into the left auricle. It had a prolongation into the left ventricle between the cusps of the mitral valve, and this prolongation had ruptured, and had a small, smooth opening at the extremity. It seemed to be an aneurysm of the posterior segment of the mitral valve, which had projected in two directions—both into the left auricle and into the left ventricle,—and the latter portion had given way. The aneurysm of the wall of the left ventricle, which I have already described, and which projected into the left auricle, was not ruptured, neither had the portion of the aneurysm of the mitral valve which projected into the auricle ruptured. Thus, there were two sharply circumscribed, rounded and tuberculated swellings projecting into and partially filling the cavity of the left auricle. The endocardial lining of the left ventricle and of the left auricle was much thickened, that of the right ventricle only very slightly so. The fossa ovalis was very deep, and a very oblique opening existed into the left auricle, through which a probe could be passed. The right ventricle was much dilated and hypertrophied. The columnæ carneæ were very numerous and prominent, and the heart muscle between the reticulations had in many places almost disappeared. At the apex of the right ventricle the cardiac wall was barely one-twelfth of an inch thick, and consisted of thickened pericardium and fibrous tissue lined by the endocardium, with scarcely a trace of muscular structure left. The columnæ carneæ in the left ventricle were unusually numerous, and many of them were reduced to mere fibrous cords. There was one two inches and a half long, attached at both ends and free in the middle, passing from the upper part of the anterior wall of the left ventricle towards the apex, and as thin in most of its course as a thread of ordinary sewing cotton, but still quite firm. Another, somewhat like it, was an inch and a half long. Both of these were on the anterior wall (septum) of the ventricle, near the commencement of the aorta, and in a part otherwise quite smooth and free from columnæ carneæ. The left auricle was considerably hypertrophied and dilated, as was also the left ventricle. The tricuspid valve was normal, but the auriculo-ventricular opening was dilated. The pulmonary valves were normal. The lungs were engorged, and in a state of brown induration. The liver weighed seventy-two ounces, and was markedly in a condition of cyanotic atrophy. The gall-bladder was small, and nearly empty. The spleen was very firm, much indurated, and weighed nine and a half ounces. The kidneys were very hard and firm, the capsules very slightly adherent; surface pretty smooth. On section they were seen to be much congested. The cortex was not diminished in extent. The pyramids were very dark. The left kidney weighed eight and a half ounces, the right eight ounces.

Remarks.—The condition of the aortic valve was a satisfactory confirmation of the observation of the direction of propagation of the diastolic aortic murmur, according to the views expressed by Dr. B. Foster in his "Lectures and Essays on Clinical Medicine," page 127—viz., that an aortic diastolic murmur, propagated to the heart apex

usually means incompetency of the posterior (or mitral) aortic segment; and that an aortic diastolic murmur propagated down the sternum towards the ensiform cartilage indicates incompetency of either the left coronary or the right coronary segment, by which the regurgitated current is thrown more upon the septum of the ventricles. The systolic mitral murmur is sufficiently explained by the aneurysm of the posterior segment of the valve, but more especially by the projection between the cusps of the valve of the prolongation of the aneurysm as described above, so preventing the valves closing properly and rendering them incompetent. It is doubtful whether the aneurysm of the wall of the left ventricle gave rise to any murmur, and if it did what its rhythm was. There was no murmur detected during life which could not be accounted for by the condition of the valves found post mortem. I should expect the aneurysm of the wall of the left ventricle to be filled during the ventricular systole and emptied during the auricular systole, because it projected into the left auricle, and would be compressed when the auricular walls contracted; in which case two murmurs might be produced—the one, occurring on the filling of the aneurysm, would be lost in the aortic systolic murmur, and the other, occurring on the emptying of the aneurysm, would be auricular systolic in rhythm; but no such murmur was detected during life. The aneurysm of the mitral valve, as it had ruptured at one part, would allow a free reflux of blood through it into the left auricle during the ventricular systole, and would, no doubt, give rise to a murmur which would form part of the mitral systolic murmur heard during life.

Nottingham.

THE FROG'S BLADDER AS AN OBJECT FOR THE STUDY OF THE EMIGRATION OF WHITE BLOOD CELLS.

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THE vigorous remonstrance of Mr. T. Wharton Jones, in a recent number of *THE LANCET*, against the belief in so well-established a phenomenon as the emigration of the white blood cells through the walls of the capillaries and small veins would seem almost comical to those accustomed to observe and demonstrate it were it not for the evident earnestness and sincerity of the writer. It is not the purpose of this short article to add more testimony as to the occurrence of emigration, since the negative results of a single observer cannot be considered as seriously militating against the actuality of a phenomenon attested to by hundreds of trained workers, who have carefully followed every stage of the process under the greatest variety of conditions. The writer wishes simply to direct attention anew to the bladder of the frog as an object in which every phase of emigration may be followed with an ease and certainty which do not belong to either of the more commonly employed objects—namely, the web, tongue, or mesentery, although it may be readily enough seen upon these. The writer's attention was called to the advantages of the frog's bladder for such purposes several years ago by Prof. Julius Arnold of Heidelberg, by whom it was employed for some of his interesting and most important studies on the phenomena of inflammation.

The abdomen of a frog, which has received the minimal dose of curare requisite to secure immobility, is opened by a lateral incision through the abdominal parietes, a little posterior to the axillary line and extending from the inguinal fold up about half way to the axilla. A glass cannula, bent at about one centimetre from the tip to an angle of less than 45°, is connected by a small rubber tube with a Mariotte pressure bottle containing $\frac{1}{2}$ per cent. salt solution. The tube and cannula being filled with the salt solution, the tip of the cannula is introduced into the anus, carried into the cloaca, and then directed forward into the bladder. In this position it is held by a thread passed through the skin behind the anus and tied around a constriction in the shank of the cannula. The animal being placed on its back upon any frog-plate suitable for irrigation (one of the forms devised by Thoma and modified by Arnold for this purpose is most