from the pressure of the tumour, and had scarcely half its normal thickness. The necropsy had to be performed hastily and under difficulties, as the friends were very hostile to anything of the kind. The specimen was sent to the museum of the Royal College of Surgeons in Ireland; and on Thursday, August 10th, assisted by Mr. F. Alcock Nixon, one of the surgeons to Mercer's Hospital, I made a further examination of it. I found that the aneurism, for which I had ligatured the carotid and subclavian vessels, involved not only the anterior innominata, but also the arch of the aorta itself; and that its sac was filled with firm hard laminæ of fibrin, showing the great repair which

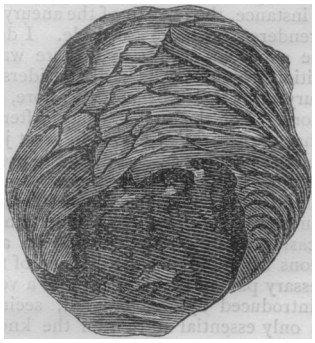

Fig. 3.—Tumour formed by clot of fibrin coagula in layers.

had taken place. At the posterior and left side of the arteria innominata was an oval opening, with its long measurement from above downwards filled with fibrin, communicating with the left vena innominata, which latter vessel communicated with the trachea at one point, and at another opened into the right lung; both these openings also being filled with firm coagula. This accounts for the dark-coloured hæmorrhage reported on the 14th, 15th, and 16th of June.

ANEURYSM OF THE ARCH OF THE AORTA: LIGATURE OF THE CAROTID AND SUBCLAVIAN ARTERIES.

By HENRY A. LEDIARD, F.R.C.S., M.D.,
Surgeon to the Cumberland Infirmary; late Medical Superintendent to the Central London Sick Asylum, Cleveland Street.

G. A., AGED 42, was admitted into the Cleveland Street Infirmary on February 2nd, 1880, complaining of dyspnœa. He stated that he was in the Horse Artillery for twelve years, and was discharged from the army two years ago, for shortness of breath and inability to carry heavy weights. He had never had syphilis, but had been a free beer-drinker; he knew no cause for the breakdown of his health, having always been well up to two years ago. Since leaving the service, he had been employed as a carriage-cleaner. His father died of gout at sixty-four years, and his mother was old, but had no particular complaint, as far as he knew. There were four children in the family, and all were living. The patient had never had rheumatism, and never met with any injury.

On examination, the patient was a stoutly built, strong-looking man, of healthy aspect and calm expression; and, but for some undue pulsation of the carotids, nothing at first sight seemed wrong. The chest was well-formed, and expanded freely; and, but for some bronchitis, the lungs were very healthy. Over the first intercostal space on the right side, and close to the manubrium sterni, was a prominence, with some heaving pulsation both seen and felt over it. This area, of the size of the top of a small teacup, was, moreover, somewhat dull on percussion. Over this region, a double murmur (of soft character) was heard. The heart was hypertrophied, the apex-beat being much external to the nipple, and in one space lower than normal; the double murmur was heard generally over the heart, but with the greatest distinctness up and down the sternum. There were fulness of the veins on the right side of the neck, and pain in the right shoulder and up the right side of the neck. There was a husky cough, and some frothy sputa in small quantity. The urine contained one-sixth albumen, but was freely and plentifully passed. The patient was kept strictly in bed, and lay at first upon his back; but, as his symptoms became worse, he gradually turned over to the left side, and at night suffered from "horrible dreams".

About a month after admission, he was much worse; his cough altered in character, from huskiness to a tracheal ring, but the voice was unaltered; he suffered from increased pain in the upper part of the chest; and the aneurysm, showing a slight tendency only to increase forwards, appeared to be growing backwards in the direction of the trachea. There was at no time any difference between the radial pulses, but the pupils were always remarkably unequal, the right being apparently contracted. There was no dysphagia.

During the first week in March, he began to suffer from some signs of laryngeal pressure, coming on at intervals, with a degree of spasm, which varied in intensity, until it began to give him anxiety, as shown by his face, which had a very distressed look. Laryngoscopic examination failed to find evidence of the direct pressure upon the wall of the trachea, for the epiglottis was folded in a leaf-like manner over the larynx. The cough became more urgent, and caused a shooting pain up the right side of the neck.

Up to this time, absolute rest, a nutritious diet, and medicines to relieve symptoms only, constituted the treatment employed; and it now became the question if this aneurysm, which apparently was becoming larger each day, could be checked by any surgical treatment. I think I never watched so rapid a growth before, and so rapid a development of grave symptoms. The percussion-note over the heaving area was not absolutely dull at any time, and there was clearly no sign of extension forwards, except that the right sterno-clavicular articulation began to take the centre of the pulsating area. There was not at this time any very marked pulsation in the episternal notch; and, as far as could be determined, the aneurysm sprang from the arch of the aorta at the origin of the innominate trunk; and, this being the case, I turned over in my mind the prospect which ligature of the carotid and subclavian arteries on the right side would hold out. I consulted with my friend Mr. R. W. Lyell, who agreed with me that, in spite of the incompetence of the aortic valves which existed, it would be well to try the effect of such an operation, seeing that the patient's condition was growing more alarming each day, and rupture of the aneurysm into the trachea threatening. Accordingly, I explained the condition of things to the patient, who readily consented to anything thought likely to relieve him.

On the morning of Good Friday, March 26th, I wrote to Mr. Barwell for a piece of his flat ligature, which he kindly sent, expressing, at the same time, his desire to be present at the proposed operation. Accordingly, at 2 P.M., the patient was chloroformed by my former colleague Mr. Hopkins, and, with the kind assistance of Messrs. Lyell, Morris, and Barwell, I tied the carotid artery above the omo-hyoid on the right side, and then, through a single incision along the clavicle, I ligatured the right subclavian in its third part. The operations were completed within an hour, and the flat ligature was used according to Mr. Barwell's directions, the knot being so tightened as to simply do little more than check the current of blood in the vessels, no attempt being made to divide the arterial coats. The ends were cut short. There was no bleeding of any moment, and no difficulty was met with. The carotid incision was stitched up, but a small drainage-tube was put in the subclavian wound (the drainage-tube used was of the ordinary kind, it being decided not to use the decalcified bone-tubing). The dressing was antiseptic. In the evening, the patient complained of headache, and, during the night, of pain in the heart.

March 27th. His bowels had been moved once. There was sickness, pain in the heart, and palpitation. There was less impulse over the aneurysm; no return of pulsation in the radial or temporal arteries. Pulse 120. Drop-doses of solution of atropin ($=\frac{1}{120}$ gr.) were given frequently. The patient was easiest in the semi-propped up posture. Ophthalmoscopic examination at night showed the retinal arteries thready on both sides.

On the 28th and 29th, his condition was modified by the physiological action of the atropin, which was stopped as soon as the pupils were a little dilated. He was somewhat excitable and restless. The palpitation left him entirely, but he had a wild look, and required constant watching. (I regret to say that the notes of these two days have been mislaid.)

March 30th. The pupils were now nearer their natural size. There was less palpitation, but there was some troublesome bronchitis and frothy sputa. He sweated profusely, and had done so all along. The tongue was clean and moist. He took a fair quantity of milk, but there was no thirst. The last two nights had been passed without sleep. (Thirty grains of bromide of potassium were given every four hours.)

March 31st. Mr. Barwell and Dr. Pearson Irvine saw the patient to-day. His condition was not regarded as satisfactory; there was certainly some tendency to pneumonia about the right base. I now for the first time gave him brandy freely, and I was very gratified with

the result, for, although his pulse was very good, still his respiration was not so; and, looking to the fact of his having been a drinker, I was the more inclined to try the effect of alcohol. He began to improve directly. The temperature, which had risen to 102°, sank to 99° in fourteen hours, and never again rose to 100°, except on the morning of April 1st.

April 2nd. All stitches were now out, and the carotid wound had healed, whereas the subclavian one was inclined to suppurate. The cough was abating, and there were much less sputa. The skin over the sternum was shrunken somewhat, and the inclination to redness was less. The general condition was satisfactory, and mental excitement gone. He slept well last night, but he was sweating profusely, and this profuse diaphoresis had, I think, relieved the circulation.

April 3rd. He was doing well. He passed a good night, but sweated profusely. There was now some pulsation in the right neck behind the subclavian artery. The pupils were to-day as they were before the atropin was given. He had a fair appetite. The brandy was reduced.

April 4th. There was now no purulent sputa, and that which came up consisted of a little froth and mucus. He had less pain in the chest, and there was much less pulsation over the sternum. The cardiac impulse was less; pulse 112. The night-sweats continued.

April 5th. Constipation gave trouble. The amount of milk was lessened, and an aperient ordered. There was, perhaps, less dulness over the aneurysm. The subclavian wound was discharging less.

April 6th. The bowels were relieved. He passed a good night; had much less cough, and there was no huskiness with it. The skin was cool; the pulse quiet.

April 7th. The pupils were of almost equal size.

April 8th. There was some thickening felt in the neck, at the seat of the carotid ligature.

April 9th. Pulsation was easily felt in the right brachial artery. The sputa were diminishing.

April 10th. He had slight giddiness.

April 16th. The subclavian wound was superficial (seen after four days' absence from home). There was less cough. He slept sometimes on the back, and sometimes on the left side. The right radial artery gained strength daily.

April 18th. There was occasional irregularity in the heart's action. The pulsation over the aneurysm had a more consolidated feel. He was eating meat-diet.

April 23rd. There was some prominence to note to-day over the sternal end of the right clavicle, a heaving pulsation, and a double *bruit*. He had no pain, but a sensation of tightness. There were no symptoms of renewed pressure upon the trachea, but there was certainly increased pulsation beneath the origin of the sternal and clavicular fibres of the sterno-mastoid on the right side. He was ordered ten grains of iodide of potassium thrice daily.

April 24th. The swelling over the inner end of the right collar-bone fluctuated, and appeared to be effusion into the joint. There was now only a trace of albumen in the urine.

April 26th. The swelling over the inner end of the collar-bone was going down.

I now lost sight of my patient until May 24th, when I was much pleased to find him looking healthy and well in all respects. He was up, and had made a large patchwork quilt. The subclavian wound had scabbed over, and there was a depressed scar. There was no dyspnœa, cough, or pain. The aneurysm had not increased in any way, and was apparently much consolidated and shrunken. The tendency to forward growth dreaded was in abeyance. The radial pulses were almost of the same strength, and the weakness in the right arm gone. The patient was much pleased with his condition, and was resting less than was thought desirable. The aortic valves were in the same condition, and the heart acting well, with no increased hypertrophy. There was no sign of aneurysm elsewhere.

The patient then was lost to my observation from the end of April; and, saving a visit to him on May 24th, I have not seen him again; but my former colleague Mr. John Hopkins, the present medical superintendent, writes to me thus.

"May 27th. A very severe attack of dyspnœa, lasting two hours, relieved by chloroform and ether inhalation.

"May 29th. An attack of dyspnœa, one hour fifty minutes, relieved as before.

"June 2nd. Severe attack of palpitation, some dyspnœa, and a rise of temperature to 104° Fahr.

"October 15th. He has been up for four months, enjoying excellent health; has constantly descended to the recreation-ground without any difficulty. During this time, he has had only slight attacks of palpitation. For the past week, he has been suffering from pains of shooting and stabbing character between the blade-bones. The heaving of the upper thoracic walls, which had become almost imperceptible, is now marked. Pulsation is strong in the first intercostal space of the right side. The sterno-clavicular articulation of the right side contains a little fluid again. He had a short attack of dyspnœa of a slight character a few nights ago; otherwise, is in good health."

This, then, is the condition of the patient at the present time, *i.e.*, nearly seven months after operation; and the testimony of a perfectly independent observer, to whom I am much indebted, and who will, I have no doubt, enable me to publish any sequel to the case that there may be.

I have little doubt in my own mind that life has been prolonged by the operation in this instance, the growth of the aneurysm checked, and the man's existence rendered far more tolerable. I do not think that very much was to be expected, seeing that there was disease of the aortic valves, a condition which Mr. Barwell considers unfavourable in treating thoracic aneurysm by ligature; and, therefore, I think the result all the more satisfactory. For the first few days after operation, there can be no question that the patient's life was in great jeopardy; so that it behoves the surgeon to select his case well, and to prepare his patient's mind for the serious nature of such an operation.

As to the flat ligature (as far as my experience in this case only goes), I think it will be found very useful, and I shall certainly use this material on the next occasion when I require to tie an artery in its continuity. Those surgeons who hold that the division of the internal coats of an artery is a necessary part of the deligation of a vessel, will be loth to try this method introduced by Mr. Barwell, seeing that, in using the flat ligature, it is only essential to tighten the knot, so as to check the circulation, or a little more.

It may be asked, And what becomes of the ligature? My answer to this would be simply, that it is never seen again, but that it unquestionably permanently constricts the vessel, as if it had been cut across with a knife.

I am aware that there is much that is unsatisfactory in the treatment of thoracic aneurysm; some put their trust in medicines, such as iodide of potassium; others are in favour of galvano-puncture. I do not at present advocate the indiscriminate use of the ligature. In recording this case, which I think is an encouraging one, I do so with a view of plainly stating what I have done, and the results that followed. The facts may be interpreted differently; but, were my patient to die to-morrow, I should hold that we had given him six months longer to live than if he had been let alone on March 26th, when the operation was performed.

Lastly, those interested in this subject will find much that is interesting and instructive in the little work *On Aneurism*, recently published by Mr. Barwell.

[I have no doubt that my friend Mr. Hopkins would enable any physician or surgeon in London to see the patient at the Infirmary in Cleveland Street, if desired.]

ANEURISM AT ROOT OF NECK: LIGATURE OF RIGHT CAROTID AND SUBCLAVIAN ARTERIES.

By KELBURNE KING, F.R.C.S.,
Surgeon to the Hull General Infirmary.

W. H., a labourer, aged 40, was admitted into the Hull General Infirmary on July 24th, 1880. The patient was born in Sheerness, and had worked all his life as a labourer on the river-side, lifting heavy weights, and doing other hard labour. For the last eleven years, he had resided in Hull, following similar employment. He had had gonorrhœa, but not syphilis. (His wife had had one living child, and one miscarriage.) The patient had had no previous illness since childhood, and never met with any accident. About eight months previous to admission, the patient began to suffer pain in the right shoulder and right side of the neck, with numbness of the arm and forearm of the same side. These were shortly afterwards followed by catarrh and irritable cough, without expectoration. For these latter, and for slight dyspnœa, he attended for some time as an out-patient at the Hull Dispensary, but without obtaining any relief. The symptoms increased; and he became unable to walk or to lie down in bed. On stooping down, he experienced dizziness and muscæ volitantes. The veins of the right side of the chest also enlarged very considerably.

On admission into the infirmary, the patient was fairly well nourished, but was much cyanosed; and the veins of the right side of the chest and neck were greatly distended. On the slightest exertion, he had dyspnœa. The cardiac apex-beat was felt two inches below and one to