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PART I.

ORIGINAL COMMUNICATIONS.

I.

On the Operation of tying the Subclavian Artery. By A. COLLES, M. D. Professor of Anatomy and Surgery, Royal College of Surgeons in Ireland, and one of the Surgeons of Dr Stevens's Hospital, Dublin.

Soon after I had been raised to the office I now hold in the College of Surgeons, I turned my attention to the study of the subclavian artery. My first object was to discover the most effectual means of compressing the artery, and to ascertain the most eligible spot for this purpose; my next, to investigate the practicability of tying this artery, either before it reaches, or after it has passed through the scaleni muscles. The anatomy of the parts satisfied me of the feasibility of the operation; and Mr John Bell's luminous statement, and lively description of the anastomosing arteries situated about the hip, encouraged me to hope for its final success. Still, however, I did not feel myself justified in stating my opinion to the pupils of the college, for, as yet, the operation had not only been untried in practice, but the proposal wanted even the sanction of analogy. At length Mr Abernethy gave to the world the first account of his operation of tying the external iliac artery. From this moment I felt myself authorized openly to express my sentiments; and every

year since I have taken occasion, both in the anatomical and surgical course, not only to state to the class my sentiments generally on this subject, but to point out to them particularly the manner in which I conceived the operation might be performed.

A case of axillary aneurism having, in the year —, come under my care in the hospital, I proposed this operation, on which I had so long meditated, to the other surgeons in consultation. The proposal, however, was overruled, chiefly on the grounds of the operation never having been performed; and I confess that I yielded to the voice of the majority with the less reluctance, because I felt a secret apprehension of some terrible revolution being produced in the frame by tying an artery of such magnitude so close to the heart. This patient, in a few months, fell a victim to the disease; but neither by argument, nor influence, nor stratagem, could I obtain an opportunity of examining the body. Mr Ramsden now published his account of the operation which he performed on this artery, after its passage through the scaleni. Although the result was finally unsuccessful, the experiment served at least to prove to me one point incontestably, namely, that the fear of immediate danger from a general revulsion in the system was totally groundless. Emboldened by the establishment of this fact, I again proposed the operation in the very next case that occurred, and it was unanimously agreed to in consultation. In this case, I undertook to tie the artery before it had yet reached the scaleni. Several months elapsed before another case presented itself; but the patient, in this instance, positively refused to submit to the operation, unless I would assure him of complete success. The unshaken fortitude, and patient resignation with which he submitted to the wide spreading ravages of this painful disease, through all its successive stages, proved that, in this determination, he was not influenced by a desire to avoid the comparatively trifling pain of an operation. Of this case I have related the appearances on dissection, as I think they suggest some useful practical inferences.

The third case was, of all, the most favourable for operation, and yet the result proved unfortunate. In this the artery was tied after it had passed through the scaleni.

CASE I.—MICHAEL COWEL, a labourer, aged 33 years, was admitted into Dr Stevens's hospital on 23d September 1811, for an aneurism of the right subclavian artery. He gave the following account of his disease:

Thinks that he repeatedly hurt himself by endeavouring to

push on with his shoulder a loaded car, the wheels of which had sunk deep in passing over heavy ground. Soon after these exertions, (perhaps in the course of a week) he began to complain at and near to the clavicle. At this time, too, he felt a tumour the size of a cherry, which throbbled with a continual pulsation. He points out a spot above the middle of the clavicle, and rather towards its humeral extremity, as having been the original seat of the disease. He did, in this early stage of the disease, observe a tumour or pulsation in a spot nearer to the sternum, but says that, as the tumour increased in size, it extended itself in that direction. It was not until the beginning of July he first felt a pain and numbness along the right arm and fore-arm.

At present, the tumour extends from the sternal origin of the sterno-mastoid muscle along the clavicle, until it reaches a little beyond the arch of that bone. It rises in height nearly two inches above the clavicle, and is of a conical form, the apex of the cone being situated at the outer edge of the sterno-mastoid muscle. The finger can be passed with facility between the clavicle and tumour, but at no part can it be passed between the posterior surface of the tumour and the subjacent parts. The aneurismal pulsation is less strong, and the tumour more compressible between the heads of the sterno-mastoid muscle, than at any other part. Pulse 74, and of nearly equal strength in both wrists. Of late he complains of slight numbness in the fingers of his right hand. He speaks of some uneasiness in the chest, which he terms "a draw on his chest." This has been much relieved since yesterday by blood-letting at the arm to the amount of fourteen ounces. His health in every other respect is good.

On Thursday, October 10th, the operation was performed, the patient being laid on his back upon a table, so placed that the direct light fell on the right side of his neck.

Two incisions were made through the integuments; the first running along the middle of the sterno-mastoid muscle, from the highest point of the aneurism to the top of the thorax; the second beginning at the middle height of the first, and ending at the sternal articulation of the clavicle. The integuments being then separated from the subjacent parts, the lower triangular flap of skin was laid down on the thorax, and the upper portion turned upon the side of the throat. The mastoid muscle being thus exposed to view, its different portions were next divided. The sternal portion was first cut through about an inch and a half above its origin. This was done with a sharp-pointed bistoury, passed on a director which had been introduced on the outer edge of the muscle. The clavicular por-

tion was then divided to the breadth of about half an inch, the director being passed on its inner edge. In both these cases, the introduction of the director was much facilitated by slightly scraping along the edge of the muscle. The lower divisions of the muscle were then dissected from the subjacent parts, and turned down over the clavicle. Now the line of the carotid artery could be distinguished, and its pulsations felt by the finger. The sterno-thyroid and hyoid muscles lying exposed, were divided in the same manner, and at the same height from the clavicle, as the sterno-mastoid had been. The division was carried only through so much of their breadth as enabled us fully to expose the carotid artery. We then proceeded to detach the lower divisions of these muscles from the surrounding parts; but here some delay was occasioned by a large vein descending from the anterior part of the throat into the internal jugular. The vein, however, being secured by two ligatures applied at a small distance from each other, and then divided in the interval between them, the inferior portions of the sterno-thyroid and hyoid muscles were raised from their beds, and turned down on the thorax. Now the sheath of the carotid artery was opened by pinching up a small portion of it with the forceps, and cutting the raised part with the knife, carried horizontally. The director, introduced at this opening, was passed down towards the thorax, and on it the sheath of this vessel, near to its root, was divided.

During this, and all the subsequent steps of the operation, the internal jugular vein was removed beyond the reach of the knife by an assistant, who, with a flat silver instrument, not unlike a powder-knife, bended at the point, drew it outwards, and held it aside.

When the sheath of the carotid artery was divided, the eighth pair of nerves became visible; it lay deep, and to the outside, nearer to the carotid as they descended towards the thorax. An instrument, similar to that above described, but of larger dimensions, and greater curvature, was now employed to protect this nerve, together with the internal jugular vein. The interval between the carotid and the eighth pair of nerves in the vicinity of the thorax, was now scratched a good deal by cautious touches of the knife, for the purpose of obtaining a view of the origin and course of the subclavian artery. And now it was found that the aneurismal tumour had extended so close to the trunk of the carotid, as to leave it uncertain whether any portion of the subclavian artery was free from the disease. Indeed, so strongly were the assistants impressed with the apprehension that the aneurismal tumour had extended to the aorta, or right

common trunk, that the majority appeared disposed to abandon the operation altogether. Supported, however, by the concurrence of Mr Wilmot, I determined to persevere in the attempt, at least till we could positively ascertain the actual state of the artery. I therefore proceeded to lay open that portion of the sheath which invests the very root of the carotid; in effecting which, a small artery was cut close to the coats of the carotid, and yielded a smart hæmorrhage. Some attempts were made to secure it with a ligature, but these only served to impress us with the idea that some irregular and nameless branch of the carotid had been cut so close to its origin, that it could not be tied. Our uneasiness, however, on this head was soon at an end, for the bleeding spontaneously ceased. The division of the sheath being completed, we could now see that only a small portion of the subclavian artery, lying between the aneurism and the forking of the arteria inominata, remained in a sound state. The length of this sound portion did not exceed a quarter of an inch, and on this we resolved to apply the ligature. For this purpose, I endeavoured, with the point and nail of my fore-finger, and occasionally with the flat handle of a silver director, to separate the artery and adjoining portion of the aneurismal tumour, from the parts in their vicinity. This was not accomplished without considerable difficulty and delay. But these disadvantages appeared to me of little consequence, in comparison with the danger that might attend the use of the knife in this critical step of the operation. When the artery seemed to be sufficiently detached, I took an aneurism needle of softened silver, blunt at the point, and longer than those in common use, armed it with a ligature of six silk threads, and, guiding it with my left fore-finger, passed it down on the inferior or thoracic side of the artery. But I could not push it upwards, so as to pass its point with safety beyond the cervical side of the vessel.

I then detached the artery still more completely from the surrounding parts, and again made repeated trials to pass the ligature, not only with the needle above described, but with the common aneurism-needle, and also with a loop of softened silver wire, but all without effect.

All these instruments had been introduced from below upwards, with the view of guarding against the danger of wounding the pleura.

It was now proposed to try whether the artery might not be surrounded, by passing the needle in the contrary direction. And, with this advice I complied, rather, indeed, because I had been so long, and so repeatedly foiled in my former at-

tempts, than because the danger of the proposed plan had escaped my recollection. With the same instruments, therefore, I made a few efforts to pass the ligature in the manner recommended; in some of which I had reason to fear that the pleura was wounded, both from the increased difficulty of respiration, and from the bubbling of the air among the blood. I soon found it still more impracticable to pass the ligature in this than in the former direction. Different plans for passing the ligature were now suggested by the assistants. Among these, one was to tie one end of the ligature into a knot sufficiently large to prevent it from slipping through the eye, and then, with a sharp hook, or pair of spring-forceps, to lay hold of the knot when carried in on the concave side of the needle. I made the attempt; but the eye was so long that it allowed the knot to remain behind the vessel when the needle was pushed forward, in consequence of which, this expedient failed. After all these trials, the ligature was at length passed with a common silver aneurism-needle, introduced from the thorax upwards. But it was necessary to use a good deal of force on the occasion, so that the artery was raised up considerably out of its natural situation.

I now put a single knot on the ligature, and ventured to tighten it in the following manner: I took a polypus-forceps, the blades of which had been made fast, with an interval left between them wide enough to receive the artery. I then passed one end of the ligature through each eye of the forceps, and, holding in each hand a blade of the forceps, and an end of the ligature, I pushed the points of the forceps down on each side of the artery. By this means the ends of the ligature, which crossed each other on the surface of the artery, were drawn in opposite directions, and the knot was thus gradually tightened.

The pulsation in the tumour and in the radial artery was now considerably weakened, but not totally suppressed. Prior to tightening the noose, the breathing of the patient had become more laboured, and he complained much of an oppression at his heart. On tightening the ligature, these symptoms increased to such a pitch, that every one present apprehended his immediate death. He was raised up, and supported in a sitting posture, but without affording him any relief; his countenance grew pale, and indicative of instant dissolution. Yet his pulse did not become intermitting, or in any manner irregular; as was observed by a gentleman, who, during these awful moments, kept his finger applied to the right wrist. In this alarming state he continued for the space of about a minute, during which some of the assistants were so strongly impressed with the idea

of his danger, that they quitted the room, lest he should expire before their eyes. During these struggles, the polypus-forceps was withdrawn, and, as the ligature had been tied with only a single knot, it is to be presumed that it yielded to the pulsations of the artery. Yet the patient did not appear to be at all relieved. Indeed, so great was his distress, and so strong my fears, that I had actually passed the index finger of my left hand along one side of the ligature, down to the noose, and was just about to cut through it with a probe-pointed bistoury; but, perceiving at this moment that his distress was a little relieved, the idea occurred to me that the wound of the pleura had been the principal cause of his sufferings. I now closed the lips of the wound, and this procured him immediate and sensible relief: However, the patient was so exhausted by this painful and tedious operation, and had suffered so much on the tightening of the ligature, that all present agreed to leave the ligature in its place, and to wait the issue of a few hours, or a few days. It was conceived, that, by thus allowing time for the wound in the pleura to be consolidated, the operation might hereafter be completed, as in that case, the right lung being capable of performing its office, the heart would labour less when this ligature was again tightened. Accordingly the lips of the wound were brought into close contact, by three stitches of interrupted suture passed through the integuments. The patient was laid in bed, and supported in a sitting posture, being incapable of lying horizontally.

Thursday evening, 8 o'clock.—Pulse 96, full, regular, and equal in both arms. After the operation, he had been unable to swallow any fluid, except by sucking a bit of linen wetted with his drink. Within the last two hours, has been able to swallow better, but still only a small sup at a time: Complains only of his heart; says that it feels as if a knot were tied on it; yet points to the scrobiculus cordis as the seat of his distress. Countenance rather flushed; skin moist; temperature of both hands equal. Sixteen ounces of blood being now drawn from his arm, procured him some relief.

Friday morning, 8 o'clock.—Did not sleep one moment during the night, yet says he passed it pretty well; his sister, who sat with him, says, that he had a great many catchings at his heart. What she means by this term, it is impossible for me to ascertain, as I have not seen him affected in the manner she attempts to describe. The blood drawn last night is very buffy, and much cupped; pulse this morning 120.

At 12 o'clock.—Pulse 116; distress rather less. It was determined that he should be bled again, but he was advised not to have the blood drawn till his distress should increase.

8 o'clock P. M.—He himself desired to be bled, and sixteen ounces were taken from him at 9 o'clock. He declared himself much relieved by the bleeding: pulse only 96.

Saturday morning, 8 o'clock.—Has had some short slumbers during the night; lies much more flat and horizontal; swallows more freely, and takes large sups of his drink, swallowing it gradually; pulse 108, regular and equal in both wrists. He thinks himself much better, but still complains of his heart. No palpitation or fluttering of the heart can be felt, when the hand is applied to the thorax.

Saturday evening, 9 o'clock. Pulse 96, as he lies without speaking; when he speaks, it increases to 110. He has eaten a small quantity of boiled bread and milk, and a little cake steeped in tea: thinks himself much better. Sunday morning.—Pulse 108; has enjoyed better sleep last night; has lain on the left side for an hour, and now lies with his head less raised.

Sunday evening.—Has eaten boiled bread and milk in the day, and some flummery in the evening; lies now with his head very little raised, and has lain on both sides at different times this day. Pulse 130, and small; complains of some pain in the wound; tongue is white; countenance rather flushed; no stool since the operation.—Enema purgans statim.

Monday, 12 o'clock.—He rested pretty well last night, and feels refreshed this morning; breathing free; he lies horizontally, and on his right side; pulse 114. The enema has procured a very copious evacuation; thirst has been relieved by taking lemon juice in his barley-water.

In the interval between our first seeing him, and visiting the rest of the hospital, he was seized with a shivering, which lasted for ten minutes. During the shivering his skin did not feel cold to the hand, nor had he himself any sensation of chilliness, but said that the shivering would go off directly. He got a little warm wine, and fifteen drops of tincture of opium. His pulse and breathing seemed not at all affected by this rigor. In half an hour after the rigor had ceased, we proceeded to dress him; the lips of the wound appeared nearly united; a very small quantity only of thin discharge had flowed along the ligature. It was now deemed advisable to cut out the two lowest sutures of the integuments, and to separate the lips of the wound; for, in the present stage of the wound, this could be easily effected, whereas, if it were deferred for one or two days more, it would possibly require the use of the knife. Accordingly the sutures were cut out, and the lips of the wound separated, by drawing the flat part of an eyed probe along the line of the wound. The knot of the ligature could now be felt at such

a distance from the artery, that we thought that the point of the fore-finger could just be insinuated a little between them. A consultation was now held, to decide on the propriety of immediately proceeding to tie the ligature. Some proposed that it should be altogether withdrawn; others recommended that the attempt of tying it should be made, but to postpone it for a day or two, till the effects of the rigor should have shewn themselves; while a third opinion urged the necessity of either instantly withdrawing the ligature, or tying it closely on the artery,—these last assigning as the grounds of their opinion, the danger, that the ligature, lying in contact with the artery, should so far produce ulceration of its coats, that they would tear under the ligature, if attempted to be tightened in one or two days hence; that the rigor had ceased, and the functions of circulation and respiration were going on perfectly well at this moment; in short, that the present moment was as favourable as any future period could be. The latter opinion prevailed, and the third or uppermost suture being cut out, and the wound thrown open, I proceeded to untie the remaining single knot. My object in doing this, was to include in the noose along with the artery, a bit of flexible silver wire, for the purpose of enabling us more readily to cut out the ligature, if we found, on tightening it, that alarming symptoms would be induced; another reason was, that we might tie on it the surgeon's knot, which would not slip, whereas with the single knot, the ligature could scarcely be tied tightly at the bottom of such a very deep cavity. Without much difficulty the knot was untied, a probe and aneurism-needle having been successively used for the purpose of widening the noose. The wire, very much bent, was included in the new noose, on which was formed the surgeon's knot; the ends of the ligature were passed, each through the eye, on the end of an iron wire; these were thrust down, as I then fancied, to the bottom of the wound, and attempts made to tighten the ligature, but to very little purpose. Now, fearing that the wire somehow prevented the ligature from being tightened, one end of it was cut off close to the surface of the wound, and the wire was then withdrawn, by using a slight force. Now, passing my finger down to ascertain the state of the ligature, I discovered that we had not arrived at the bottom of the wound; the wires had descended only to the neighbourhood of the anterior surface of the vessel. I now separated, with my finger, the recent attachments of the artery to the surrounding parts, and passing each end of the ligature through the eye of a polypus-forceps, the blades of which had been previously taken asunder, I passed these down to the bottom of the wound, and, giving the upper

one to Mr Wilmot to hold, I held the lower one myself, and at the same time drew it very tightly. This attempt reduced the strength of pulsation both in the tumour and at the wrists; but we found that this effect was owing, in a good measure, to the artery being raised forward, and to the influence which pressing down the blades of the forceps had, on rendering it more tight. The reason why I held the blade nearer to the thorax, was, that I feared, if it had been directed downwards, the pleura must almost inevitably have been again lacerated. I next made the attempt, having only the upper end of the ligature passed through one blade of the forceps, while the lower, which, from being short and wet, could not be held firm by the fingers, was rolled round the other blade, while the fore-fingers of my right hand was employed in giving a favourable direction to the ligature, so as to prevent it raising the artery up out of its situation. After one or two attempts in this way, the closing of the artery was effected, as was manifested by the pulsation of the radial artery completely ceasing. Some slight obscure pulsation, however, was still to be felt in the tumour, which led some present to apprehend that the ligature was not drawn sufficiently tight; but, on a moment's reflection, it occurred to us, that this degree of pulsation was communicated to the tumour by the pulsation of the sound part of the artery. A small quantity of florid blood flowed from a deep part of the wound, but not in a stream, just as the ligature was tied. A second knot was now made, and the wound closed by two points of interrupted suture.

During the tying of the ligature, no alteration was observable in his countenance, respiration, or the actions of his heart. An assistant who had held his hand on the left radial artery, during the tying, could not discover the slightest alteration to have been induced by it; the patient did not exhibit the slightest symptom of pain; in fact he seemed not to suffer, in the slightest degree, from this sudden revolution effected in the arterial system; he moved the arm as freely as ever.

I saw him an hour after the operation, at which time the temperature of both hands was equal, being in both 91 degrees. He continued free from any uneasiness. He had drunk very largely of whey during the operation, which lasted one hour; his thirst at this time continues unabated; he wishes for lemonade. 8 o'clock, P. M. Monday.—Pulse 120; temperature of both arms 91 degrees; thirst continues; has not had any sleep; tongue white and dry; skin moist, and feels of the natural warmth; he did not use any food since the operation this day.

Tuesday morning, 8 o'clock.—Pulse 130, in half an hour after, 120; passed the night without sleep, and has had very

great thirst, yet he thinks himself better. He wishes for a few morsels of broiled meat, rather to indulge a medical theory, than to gratify his appetite, for his stomach and bowels are extremely flatulent, which he fancies arises from want of solid food. Tongue is white; thirst is now less urgent; temperature of both arms equal.—Habeat haust: efferves. tertiis horis.

Tuesday evening, 9 o'clock.—He has just fallen asleep, and is talking almost incessantly, is tossing his limbs about, and would appear to suffer great distress; yet his sister says, that this is not different from what occurs to him when in health; for that when he first falls asleep, he talks over the occurrences of the past day, and tosses himself about in the bed, but that after he has been asleep for some time, his repose becomes quiet and profound. Pulse 120; temperature of both arms apparently the same; has had some sleep during the day, and thinks he might have had more, had he not wished to reserve it for the night; thirst is very inconsiderable since morning; eat some flummery; tongue more clean.

Wednesday morning, 8 o'clock.—He has been just disturbed from a short sleep, and appears rather confused; has passed a good night, but thinks himself weaker this morning. Pulse 120, smaller and weaker; thirst not more urgent; complains of the fetor of the discharge from the wound, and wishes it to be dressed. A considerable quantity of a yellow serous fluid came from the lowest point of the wound; part of it flowed spontaneously, and some escaped when pressure was applied to the more remote parts of the wound. The skin did not adhere to the subjacent parts; a small quantity of air seemed to be interposed. No pulsation is felt in the tumour, on the humeral side of the longitudinal incision of the neck. He appeared a good deal fatigued after the dressing. Tongue white.—Habeat pil. purg. unam statim, et post horas tres, enema purgans, nisi prius alvus soluta sit.

Wednesday, 3 o'clock P. M.—Has had some refreshing sleep, and for a much greater length of time than heretofore; has eaten five or six morsels of beef-steak, and lately a little flummery; one copious stool after the injection. The nurse reports that a small quantity of blood came off with the stool, not more than was sufficient to streak it. He is now in a quiet sleep, lying on his left side.

Wednesday evening, 9 o'clock.—Has got still more sleep; temperature of the right hand, by the thermometer, this day, 90, of the left hand 92, but the right has been a good deal exposed to the cold, being very seldom kept under the bed-clothes; pulse 120. A few minutes before this visit, a shivering had

come on, which still continues, yet he does not experience the sensation of coldness, nor does his skin feel cold to the hand. His breathing now appears a little hurried, as he lies on the right side, yet, when desired to make a full forced inspiration, he does not experience any pain from it, except what he refers to the heart, or *scrobiculus cordis*, and this only in a trifling degree.

Thursday morning.—The rigor did not continue half an hour; he passed a good night, had one sleep for three hours, and during the rest of the night had a considerable share of sleep. Pulse 120, rather small; tossing of the lower extremities rather increased; thirst much less; discharge from the wound copious, but has passed off,—none of it has lodged. On pressing with the sponge, an unusual quantity of air escaped from under the skin; no emphysema noticed in the vicinity of the wound. An obscure pulsation in the tumour was either felt or fancied by me; certainly none can be felt at the wrist; size of the tumour a good deal reduced.

Thursday evening.—Has slept well this day; has eaten more flummery than on any former day; a slight emphysema in the lower and anterior part of the neck. At five o'clock this evening some blood had been observed on his shirt, and on the bandages, yet in every respect he appears as well as usual. At 7 o'clock P. M. the dressings were removed, and the sutures cut out. On raising the flap of skin, a small quantity of coagulated blood was found in the wound, though not in its deepest part; emphysema increased; obscure pulsation continues to be felt in the tumour. Three small pieces of sponge were laid in the wound; a larger piece was laid on the skin, and retained by adhesive plaster, as pressure could not be applied by a bandage without confining the thorax too much. Pulse 120; stomach moist; tongue white; temperature of limb, and state of breathing as this morning.

Friday morning.—At 8 o'clock A. M. I received from one of my pupils the following note. “About one o'clock last night this poor fellow got a change for the worse, appeared as if strangling, with continual tossing of his legs and arms; complained of his heart, and said there was some one pulling a cord round his neck. He became quite delirious, continued in this state for nearly half an hour, after which he got comparatively easy, and has been almost ever since insensible, and is at present, I think, very near his end.”

I visited him at 9 o'clock this morning. He lay insensible, rather pale, but not of that deadly paleness which so often at-

tends great hæmorrhagies, his breathing very laboured, in short, —with every appearance of immediate death.

About 10 o'clock this morning he died.

In a few hours after his death, we hastily removed the heart and large vessels, so low down as the clavicle, being prevented by the attendance of his friends from examining the parts *in situ*. No blood was effused into either cavity of the thorax. The lungs of both sides were sound; the upper extremity of the right lung had a slight adhesion with the parts in the vicinity of the ligature. The aorta was slit up from the heart to the forking of the arteria inominata; and thus we had an opportunity of observing the very diseased condition of the coats of this artery, as manifested by the wrinkled state of its lining membrane. A very remarkable pouch or recess, capable of receiving the point of the little finger, appeared in the wall of the aorta, on the right side of the artery, about one inch above the heart.

In the apex of this dilatation the coats of the artery were extremely thin, as if, the middle coat having been removed by absorption, the lining and outer coats had adhered together. The arteria inominata was dilated at the place of its forking. Between this dilatation and the aneurism for which the operation had been performed, there was not above a quarter of an inch of the subclavian artery free from disease, and on this part the ligature had been applied. A pretty large opening had been made by ulceration, through the coats of the artery, immediately above the ligature.

The next case of disease requiring the operation of tying the subclavian artery, occurred in William Levance, an invalided soldier, who was affected with aneurism of the axillary artery a little below the clavicle. The disease seemed to have arisen spontaneously. Tumour was the size of a pullet's egg at the time of his applying for relief.

In full consultation, the operation was decided on; but this man refused to submit to it, unless we assured him of complete success. He lingered for some months, and appeared to die, not from hæmorrhage, but rather from extensive suppuration, and long continued irritation.

Appearances on Dissecting the body of William Levance, ætat. annos 55.

26th April 1813.—Very considerable swelling occupied the right side of the body, extending from the clavicle down to the eighth rib, and from the nipple of the breast across the arm. The arm and fore-arm were very much distended by an œdematous swelling. Three large ulcers a little below and before

the axilla ; inferior costa of the scapula rough on its internal surface ; the inferior angle of this bone exposed and rough. On opening the thorax, the viscera were found perfectly healthy, with the exception of slight adhesions of the right lung to the pleura costalis, and some water in that side of the chest. Heart rather small, but appeared perfectly healthy. Large arteries near the heart not at all dilated, and no other traces of disease in any of them than some very small opake spots visible on their internal coats.

The pectoralis major was of a pale brown colour, and much thinner than natural ; the pectoralis minor converted into a substance resembling a strong fascia. The parts above the clavicle were still in a healthy state ; the different steps of the operation for tying the subclavian artery before it had reached the scaleni were performed on it. The trunk of this artery was traced of natural size and healthy texture, for an inch and a half below the origin of the vertebrae, and running over the front of the aneurismal tumour. At this place, its coats became so thin, that it was no longer possible to distinguish them from the coats of the tumour. Immediately before it became indistinct, this part of the artery seemed dilated to the breadth of a quarter of an inch. The articulation of the humerus was opened, and communicated with the aneurismal tumour. The branches of the subclavian artery did not appear at all enlarged. The basilic vein was thickened in its coats, but not at all enlarged in its diameter.

On the 19th June 1813, I was consulted by the Rev. Mr S. aged 48. He was a man of an uncommonly athletic frame ; had constantly enjoyed the most robust health, and had always lived a regular and temperate life. The account he gave of his complaint was as follows : One night before Christmas last, while lying in bed, his right arm was suddenly seized with a numbness, and the right hand felt as if instantaneously enlarged to twice its natural size. Soon after this, the middle of the forearm and the insertion of the deltoid muscle were attacked with pains. He said that the physician, whom he had consulted in the country, had remarked, with some surprise, that he could not feel any pulse at the wrist of the arm affected. The disease passed for rheumatism until he came up to Dublin ; but, on his arrival in town, having applied to Dr Harty to be electrified, the Doctor, during the process, observed a portion of the chain, which happened to lie on Mr S.'s breast, to be moved up and down by a violent pulsation of some subjacent part. Struck with this occurrence, he proceeded to examine the seat and cause of

the phenomenon, when he discovered an aneurismal tumour situated below the clavicle, and covered by the pectoral muscle.

On the day following I saw him, and found the aneurism nearly of the size of a goose egg. The tumour pulsated strongly, but seemed, notwithstanding, to be both deeply seated and thickly covered. The pulse of the right radial artery was as full and strong as that of the left. By pressing with my thumb upon the diseased artery, above the clavicle, along the outside of the scalenus muscle, I suppressed the pulsation both in the tumour and at the wrist. But a strong pressure on the tumour itself, even when continued for some time, excited no uneasy sensation whatever, either in the region of the heart, or in any other part of the thorax; nor did it affect the powers of respiration in the slightest degree. In short, nothing preternatural could be discovered in the actions either of the heart or of the arteries, under any possible variation of circumstances.

On this very important case I requested a full consultation without loss of time; and accordingly next day Messrs Richards, Peile, and Wilmot, Dr Harty, and I, met in consultation. It was our unanimous opinion, that, although the present disease could not be clearly traced to an accidental injury, yet, as not the slightest appearance of disease could be discovered in any other part of the arterial system, it was our duty to propose the operation of tying the subclavian artery.

Mr S. who was a man of uncommon fortitude of mind, consented at once to submit to this formidable operation. He wished, however, first to return to the country for some days, in order to settle his affairs. To this delay we acceded, advising him to avoid all bodily exertions, to live on very low diet, and to debar himself of a full meal even of the coarsest fare. We also prescribed some strong purging pills, to be taken frequently, and directed that he should be bled twice at least before his return to Dublin.

On the 16th of July he returned, a good deal reduced in flesh and colour. The aneurism had increased in size during his absence, principally in the direction towards the clavicle. Indeed, to judge by the eye only, the tumour seemed to have extended to that bone; but by the touch it could be ascertained that the tumour and the clavicle were not yet in contact. He now told us that some of his friends in the country had reminded him of his horse having fallen and rolled over him, a few days before he felt the numbness of the right hand; and he can now distinctly recollect that he suffered considerable pain about the shoulder at the time of the fall.

I commenced the operation, by an incision beginning near to

the acromion, and terminating about midway up the side of the neck. Another incision, commencing from the same point, was carried along the clavicle, until it reached the outer edge of the sterno-mastoid muscle; the triangular portion of integuments included between these incisions was raised up from its apex, and laid back upon the throat. In this first step of the operation, some pains were taken to avoid wounding one or two pretty large veins which ran very superficially along the side of the neck. When the integuments were thus removed, I detached the external jugular vein, at the highest point where it lay uncovered, and with a blunt aneurism needle passed a ligature round it. I next tied up, in the same way, a branch of this vein which entered the trunk a little above the clavicle, in a direction from the acromion; and I then secured the lower extremity of the denuded trunk of the jugular vein: but to effect this last was a task of more difficulty, for the vein here was not only covered by three or four layers of tough cellular substance and fat, but was, besides, at times suddenly puffed up to a very great size, especially whenever from pain the patient made a great exertion, accompanied with a deep and long-continued expiration. But, notwithstanding all these ligatures, the trunk of the vein was still freely supplied with blood from below, as appeared by its occasionally swelling in deep expirations. This obliged me to secure the trunk with a third ligature, about an inch above the clavicle, and, having done so, I cut the vein across between the two lowest ligatures, and laid the inferior portion of it down upon the clavicle. Now removing a little fat, I saw the omohyoid muscle covered with a fascia; it was of an uncommonly large size, and lay very low, near to the clavicle; it consequently became necessary to sacrifice it, in order to get at that part of the artery which lay near to the outer side of the scalenus muscle. For this purpose, a very thin silver spatula was passed under the upper edge of the omohyoid muscle; with this it was raised a little from its bed, and was cut across. On removing this muscle, a thin fascia appeared covering a deep bed of fat. Having cut through the fascia, I now, with the flat end of a silver director, cleared my way among the fat, until I could feel, though not see, the artery. As the vessel was now lying at the bottom of a deep contracted cavity, I judged it necessary to convert this into a more open and less embarrassing form of wound. This I did by cutting across the edge of the trapezius muscle and the numerous layers of membrane which occupied the space included between the deep cavity and the acromial end of the external wound. In effecting this, one small artery was divided, and secured by ligature. When the wound was thus enlarged, the

most anterior of the nerves going to the brachial plexus appeared to view. I now proceeded to lay bare the artery, holding my finger down upon it, and turning aside the superincumbent fat with the flat end of a silver director. But so great was the quantity of this substance to be removed, that, although I cut away three or four large pieces of fat with a scissars, and drew them out with a forceps, yet, to prevent the remainder from falling down again into the cavity upon the artery, I was obliged to have it held aside, by three long and broad spatulas of prince's-metal, bended at the end, and applied one to each side of the wound. This materially facilitated the subsequent steps of the operation, by keeping the artery uninterruptedly exposed to view. My next object was to detach from the surrounding parts that portion of the artery which lay close to the scalenus muscle. To effect this, I first made use of the flat end of the director, scraping with it along the outer or acromial side of the artery. I then ventured to separate it more completely, by introducing a blunt aneurism-needle in the room of the director. This I moved upwards and downwards along the vessel, until I was enabled to pass it freely under the artery, and to receive its point on the end of a narrow spatula, introduced between the vessel and scalenus. Feeling the point of the needle on the spatula, I was satisfied that it had cleared the artery. I now therefore depressed the handle. On doing so, I observed that the point was covered by a dense white membranous substance, strongly resembling the coats of an artery. I withdrew the needle, armed it with a double flat ligature, (about six threads thick,) and again introducing it on the acromial side of the vessel, I quickly showed its point by the side of the scalenus, covered with the membranous substance as before. I hesitated for a moment, but every one present being satisfied that this substance was not a part of the vessel, I readily tore through it, by scraping it with the flat end of the director. Now, merely by depressing the handle of the needle, without in the slightest degree raising the artery from its bed, I was enabled to catch the ligature on the inner side of the vessel. Having got a secure hold of it, I withdrew the needle, leaving the ligature, doubled, under the artery. I then divided the ligature into two, and tied the lower with a single knot. Mr Piele, who had applied one hand to the tumour, and the other to the right radial artery, announced, as I tightened the ligature, that all pulsation had ceased in both.

The assistants, being all anxious to satisfy themselves of these facts, I let go the ligature. Although I let it out of my hands but for the few moments I was necessarily occupied in these inquiries, yet, even during this short period, the pulsation perfect-

ly returned; I therefore again drew the ligature tight, the pulse in the limb ceased, and I quickly made fast the ligature with a double knot. To enable us to tie this knot, we had no occasion for any instrument; nothing more was necessary than to catch the ends of the ligature close to the vessel, and then to press on them with the points of the fore-fingers, held on a level with the trunk of the artery. No other precaution was necessary to save it from being pulled up from its bed, in drawing the ends of the ligature tight. The unanimous voice of all present directed that the second or upper ligature should be tied, which was done, close to the first, with a double knot. In this awful and critical step of the operation, I kept my eye firmly fixed upon the patient. His countenance did not undergo the slightest perceptible change. No alteration was observable in the actions of his heart, or in his respiration; nor did he experience any pain or particular sensation in the limb on the tying of the artery.

It should be observed, that a large vein, which, in the dead subject, I had often found running across the artery, in a direction from the scapula towards the thorax, and which, I had feared, might be productive of much inconvenience on the present occasion, was here found to be flat and empty, and to run so near to the thorax as not to interfere in the smallest degree with the passing of the ligature.

When the operation was finished, three stitches of interrupted suture, aided by adhesive plaster, kept the lips of the wound in contact; on the flap was laid a piece of dry sponge, to bring into apposition the upper and under walls of the cavity, which had been left after the operation.

Shortly after he had been laid in bed, he complained of cold, but had no rigor. In the course of an hour, he felt himself growing too hot. In three hours after the operation, his pulse was 96. In this short period, he forced me to change his position two or three times, from his back to his sides, to try if he could by this means obtain any mitigation of what he termed a pain in the small of his back. He did not, however, complain of any pain or fulness in the head, or of any affection of the heart, or difficulty of breathing. His distress, though rather intense in degree, was of the same kind as I have frequently witnessed after amputation, or other great operations.

Mr Wilmot, who remained with him from three o'clock this day until nine o'clock at night, informed me, on my return, that his pulse had got up so high, that he had been almost tempted to bleed him; but a sweat breaking out, had reduced the pulse to its present state, (120.) For the remainder of the night I took charge of him, and, during that time, he was affected with

a slight tossing of his lower limbs. He continued to complain of his back, and did not enjoy more than five or ten minutes sleep at a time. He had some thirst, and, in the course of the night, his pulse rose to 134. He did not complain of the wound, except when he turned on that side, or was awkwardly handled, and then he said it was sore. The sweat having at one time ceased for two hours, I observed that the right hand and arm became dry, as well as the left; and, on the return of the sweat, both arms were equally moist. The heat of both arms, too, appeared to be the same since the operation, and he has continued to enjoy the feelings and full power of the right hand.

Wednesday morning.—At six o'clock this morning I took 12 ounces of blood from his left arm; it flowed slowly, for he drew back his arm while I was making the incision. I gave him a draught, with two drachms of aq. ammon. acetat.; and for a short time after this, I fondly flattered myself that he became more easy and composed. These transient hopes, however, soon gave way to more gloomy apprehensions; and when I reflected on the quickness of his pulse, his restlessness, and want of sleep, his forgetfulness, and occasional wanderings of mind, I became greatly alarmed. I therefore summoned a consultation of all the gentlemen who had assisted me, for an earlier hour than that agreed upon the day before. We met at 11 o'clock A. M. His pulse was now 134, and the strokes ran so into one another, that it was difficult to count them. This state of the pulse, we judged, would not be improved by a repetition of the blood-letting. It was therefore agreed that he should be first purged, then take tincture of digitalis, and, if his restlessness required it, take an opiate at night.

Three o'clock P. M.—At this hour the physic had only operated once, and then very sparingly. His pulse was now driving at a rapid rate. He complained of an occasional cough, which distressed him so much, that he was forced to entreat the attendant to keep one hand on his head, and to grasp his left hand with the other, whenever he felt a fit of it coming on. He complained also of a soreness in his throat when he coughed or swallowed; and he pointed to the middle of his throat as the seat of this affection. Although I suspected that his fears made him magnify his distress in this particular, (for he apprehended that the inflammation, spreading from the wound to the throat, must quickly prove fatal,) yet, when I recollected that my former patient Cowell had complained of the same sensation, I deemed it prudent to meet it early, and therefore instantly commenced with the digitalis, although his bowels had not been sufficiently freed by the purging medicines.

At 4 o'clock P. M. he got the first dose of 10 drops.

At 8 o'clock the second dose of 15 drops.

At 10 o'clock 25 drops.

At 2 o'clock A. M. Thursday, 30 drops; and at 6 o'clock the same repeated.

By this medicine his pulse was reduced, so that at 10 o'clock P. M. it beat 120, but still with the same indistinctness as before.

Thursday morning, 6 o'clock.—The longest sleep he has had in the course of the night has not been above half an hour; the tossing of the lower limbs continues; they are dry, and, though covered with woollen stockings, are inclined to be cold. Countenance is natural, but more reduced than when in health. Mental faculties more perfect than yesterday. Sweat continues on the head, trunk, and upper limbs. Has had many stools through the course of the night. State of tongue and thirst as yesterday. Pulse 120, and indistinct. Moans at times to-day as he did the day before. Says that he has an uneasiness at the small of his back, but that it does not amount to pain. Thinks his throat better. There is some swelling, with a slight appearance of inflammation, across the top of the thorax. He now entertains better hopes of his recovery. He begins, however, to complain of some uneasiness in his chest, but says that it is relieved by sighing. The bandage, which feels rather too tight on the chest, is now cut across. Heat of right hand, measured by the thermometer, 94; that of the left hand 96.

Thursday evening, 8 o'clock.—This day, at 1 o'clock P. M. he was suddenly seized with a rigor, which lasted for a quarter of an hour. This was succeeded by a profuse sweat. During the cold fit he talked much and incoherently. Soon after the hot fit commenced he started up, jumped out of bed, and became so violently outrageous, that he required two strong men to hold him. In this state he continued for more than an hour. During this paroxysm he made the most powerful exertions with the right as well as with the left hand. After the paroxysm had subsided, he enjoyed a sleep of half an hour, during which his breathing was natural. The cough, which had distressed him to such a degree yesterday, is so much relieved to-day as to cause only a slight and momentary uneasiness in his chest.

Thursday night, 10 o'clock.—He had been raving a good deal at 8 o'clock this evening, but at half past nine he became quite collected, and inquired very anxiously about his own situation. Pulse more distinct, though not less frequent. Sweats continue. Some wheezing in his chest. Distress of that part less than it had been early in the evening. A large blister is applied to his chest.

The inflammatory fulness and redness of the skin at the top of the sternum and left side of the throat is considerably increased; the slightest pressure on this swelling gives him very sharp pain. Mr Wilmot and I conceiving it possible that his distress might be aggravated by some collection of matter confined or pent up within the wound, removed the dressings. Only a small quantity of reddish water was discharged. I then cut out one of the sutures, and passed a probe into the deepest part of the wound, conducting it along the ligature of the artery. We then made a pressure on the inflamed integuments, at the top of the sternum and left side of the thorax, but without obtaining the smallest additional discharge. At this time the aneurismal swelling was in appearance quite removed, and both sides of the thorax were to the sight and touch perfectly alike.

Friday morning.—He passed the night without any sleep; raved a good deal, but was not violent. Purging more frequent. Has taken two doses of a mixture, each dose containing ζ ss. oxymel. scillæ. Cough has not distressed him. He has expectorated some mucus. During the night he complained a good deal of the right fore-arm and hand,—at one time of numbness, and at another of pain. The hand is held with the fingers folded in, and rather stiffened. It now became too obvious that the storm, which had been collecting since the operation, had now taken a fatal direction. The present state of the limb so strongly proved the near approach of mortification, that, however reluctantly, I was forced to relinquish every ray of hope, and to prepare my mind for the speedy termination of a case which I had watched with more fluctuations of hopes and fears than ever had agitated me on any former occasion.

Two o'clock P. M.—The fore-arm was distended at the insertion of the pronator teres, and also where the extensors of the thumb pass over the end of the radius; the hand and fore-arm cold; the fingers rigidly flexed. The usual applications were made to the limb, but without affording any relief. The mortification went on increasing; his delirium continued for the greater part of the night; and at four o'clock on Saturday morning he died.

Appearances on examining the body 26 hours after death.

Suppuration was established under the integuments on the fore-part of the throat, anteriorly to the sterno-mastoid muscles. On the thorax being laid open, we discovered an appearance as of suppuration commencing on some masses of fat lying in the anterior mediastinum. The upper lobe of the right lungs was attached to the ribs by close and old adhesions. Between three

and four ounces of water found in the pericardium. The jugular veins, both the external and internal, were of a deeper colour than usual. Heart felt rather soft; right auricle full; right ventricle less full than usual. No disease in any of the valves on either side of the heart. The internal surface of the right auricle, especially on the septum of the auricle, more red than usual. This redness, though of a brighter tinge than that of the jugular veins, was not such as to indicate the existence of inflammation of this cavity. The venous blood was more fluid than usual. Coagula were found in the right and left ventricles, but not uncommon either in their size or other properties.

On endeavouring to separate the aneurismal sac from the walls of the thorax, it was found to have connected itself so intimately with the second rib as to have its cavity laid open by an attempt to disunite them. The form of that portion of the bone upon which the aneurism rested was changed from a flat surface to a cupped form. The extent of the altered part of the second rib was about half an inch.

The aorta, with the great arteries springing from its arch, and the humeral artery, being removed from the body, were examined next day.

The aneurismal tumour had extended more in length than in breadth, and had ascended so high as to have reached near to the spot on which the ligature had been applied. The aneurismal tumour was nearly as large as a pullet's egg.

The artery immediately above the ligature was seen thrown into folds and furrows, which would seem to be the inevitable effect of tying an artery of so great a size. On removing the ligature, and slitting up the artery, its internal coat was found ruptured by the ligature only at one part, to the extent of about one-fourth of its circumference. Through the remainder of the circle the internal surface of the artery presented a white line, obviously produced by the tightening of the ligature. Two very small portions of coagulable lymph were found immediately above the ligature. The trunk of the artery below the ligature was rather small. The branches of the subclavian artery were not at all enlarged.

I have been (perhaps tediously) minute in detailing the particulars of the foregoing cases; because we have, as yet, but one account published of the operation of tying the subclavian artery after it has passed through the scaleni muscles, and no instance, I believe, has hitherto been recorded in which this artery was tied before it had arrived at these muscles. Under such circumstances, I would not presume to exercise my own

judgment in omitting those particulars which to me did not seem important.

As I wished that every one who reads these accounts should be unbiassed in drawing his own inferences from the facts, I have studiously avoided interweaving any reflections of mine own. Such as have occurred to me in my attendance on these cases, I shall now briefly state.

To lay bare the right subclavian artery before it reaches the scaleni, will not be found difficult by any surgeon possessed of a steady hand, and a competent knowledge of anatomy; but I fear, that, with the utmost dexterity, much difficulty will be experienced in passing and tying the ligature, even in the most favourable cases. The instrument delineated in Mr Ramsden's book appears to me well calculated for the purpose, and yet it is not free from objection. I should fear that the coats of the artery might be cut by the sharp edges of the flexible steel plate as it is passing round the vessel. Some means similar to those I have mentioned must be adopted, to prevent the artery from being raised out of its bed while the surgeon is tying the knot.

This operation, difficult on the right, must be deemed absolutely impracticable on the left subclavian artery: For the great depth from the surface at which this vessel is placed,—the direct course which it runs in ascending to the top of the pleura,—the sudden descent which it makes from this to sink under the protection of the clavicle, and the danger of including in the same ligature the eighth pair of nerves, the internal jugular vein, or the carotid artery, which all run close to and nearly parallel with this artery; these all constitute such a combination of difficulties, as must deter the most enterprising surgeon from undertaking this operation on the left side.

Even on the right side this operation will be very seldom required; for it can only be called for in injuries or diseases of that small portion of this artery which lies between the scalenus and the clavicle. It is scarcely necessary to observe here, how frequently such a case will be complicated with diseases of the great trunks of the arteries nearer to the heart, or how difficult it must be to discover the existence of those internal affections. When examining any pulsating tumour near the top of the thorax, the surgeon should bear in recollection the remark made by Mr Astley Cooper, as quoted by Mr A. Burns, in his *Surgical Anatomy of the head and neck*, "that aneurism of the aorta may assume the appearance of being seated in one of the arteries of the neck." The quantity of blood lost by the hæmorrhage, which yet we presume was the immediate cause of death in this

case, was very inconsiderable, being infinitely less than I had ever before known to prove fatal.

The operation of tying the subclavian artery on the acromial side of the scaleni muscles is one which will be much more frequently required, and which can be performed with equal facility on the artery of either side. The most striking and most unfavourable circumstance of this operation is, the great length of time required to perform it, although the ultimate and essential steps of it had been executed with so much facility.

This delay is by no means unavoidable. Indeed, any man who will take the trouble of reflecting on the anatomy of the parts concerned, or who will himself perform this operation on the dead subject, must be convinced that it may be executed in as short a time as the operation for femoral aneurism. The causes of delay in this instance were, first, the almost unprecedented nature of the operation; the caution with which we tread upon untried ground rendering every incision more slow, and every step more deliberate. Next, the great anxiety to secure every vessel, even the smallest branch of an artery, or a vein, lest our view should be obscured, or our progress obstructed by any quantity of blood flowing into the wound, was a principal source of this delay. By referring to the account of the operation, the reader can readily estimate what loss of time was occasioned by this object. I do not mean to say that we should pass through the various stages of the operation absolutely regardless of the flow of blood; but I am confident that we have no occasion to tie up any but the larger veins, and the suprascapular artery, if it should chance to be wounded. The curved spatulas, while they hold aside the lips of the wound, will at the same time serve to stop the bleeding. I cannot forbear to recommend, in the strongest manner, the use of these instruments, not merely in this, but in every other operation where the depth of the wound is considerable, compared with its length, and where it is of importance for the surgeon to distinguish the parts which lie at the bottom of such a cavity.

The necessity for removing any portions of fat can occur only in very corpulent subjects.

In passing the needle round the artery, it will be found absolutely necessary to have the scalenus muscle held back by one of these spatulas, otherwise it will be impossible to pass the ligature without including along with the artery some portion of the muscular fibres.

The facility with which the ligature was passed round the artery was in the highest degree gratifying to every one present. This inestimable advantage will be secured by an attention to

the following points: First, To extend the wound out towards the acromion, by which the form of it is changed from a deep cavity to a superficial wound; next, To introduce the needle on the outer or acromial side of the artery; and, lastly, to select the most favourable part of the artery. This, on inspection, will be found to be where it has just passed through the scaleni. How necessary this selection is, will appear by a perusal of the account of Mr Ramsden's operation; for he, by attempting to secure this vessel near to the first rib, or rather, as he says, at the lower edge of the first rib, found it almost impossible to turn the needle round the artery in the very narrow space between this bone and the clavicle.

Cases in which this operation may be necessary, will not be very unfrequent. In wounds of the axillary artery, either while it runs in front of the thorax, or while it lies along the humerus, this operation will be preferable to following the course of the wound by cutting through the pectoral muscles in the one case, or entangling ourselves in the brachial plexus, when the artery is wounded in the axilla. The pain and difficulties of the operation above described are trifling, when compared to those which must occur in following the course of these wounds.

When an aneurism of the axillary artery shall require this operation, we may indulge a confident hope that the rest of the arterial system is free from disease, as it appears to have been in two of the foregoing cases, that of Levancee, and of the Rev. Mr S.; one, where the disease arose spontaneously,—the other, where it could be traced to accidental injury. Although this operation has not yet proved ultimately successful, yet I think we should not despair. The history of surgery furnishes parallel instances of operations, now generally adopted, which, in the few first trials, failed of success.

Stephen's Green, Sept. 6, 1814.

II.

Observations on the Fœtal Liver, &c. &c. By JAMES BRYCE, F. R. S. E. Fellow of the Royal College of Surgeons Edinburgh.

IT is a circumstance known to all anatomists and physiologists, that the size of the liver, compared with the other vis-