injury, he began to drag his legs, which felt unusually heavy to him. He now became paraplegic again, entered the hospital, and died at the end of twenty-two years after his fall. In the vertebral canal was found an apparent collapse or *vacuity in the place of the cord*. *For two inches the substance of the cord had disappeared*, and there was a confused structure of the arachnoid and pia mater, the dura mater having undergone a less destructive change. Each end was soft and diffuent, and it was difficult to decide whether there was any nervous substance intervening between these, nothing being recognized as the remains of the spinal marrow; and yet, notwithstanding this pathological condition of it for inches, this man, a shoemaker, had pursued his trade and travelled extensively for nearly a quarter of a century.

In the review now of these cases here collected in a week or two, we have three in which the medulla spinalis was nearly divided, in one probably it was so divided, this patient having recovered, and in seven the division was known to have been complete. The authorities for these cases are Sir Astley Cooper; Surgeon Hntin, of the French army in Algiers, whose patient lived fourteen years; and Prof. Gross, in whose case all the cord was cut save a mere thread, death occurring in eight days. Dr. Eli Hurd reports the case of supposed division and reunion of the cord. The seven cases of its complete severance, without extinction of life, are:

1st. United States soldier, lived a month, see catalogue, Army Medical Museum, War Department.

2d. Surgeon Boutel, soldier in the French army, lived twenty-six days.

3d. Sir Astley Cooper.

4th. Dr. Parkman, of Boston, lived two months.

5th. Prof. Gross, lived three-and-a-half days.

6th. Surgeon Page, Carlisle, England, lived fifteen months.

7th. Surgeon Alexander Shaw, Middlesex Hospital, London, lived twenty-two years.

The conclusion, therefore, is indisputable, that death does not necessarily follow a division of the spinal cord.

ART. IX.—*Four Cases of Aneurism treated by Ligation*. By ROBERT REYBURN, M. D., Associate Professor of Anatomy and Professor of Clinical Surgery, Med. Dep. Georgetown College, D. C.

THE following cases of aneurism have been treated at the Freedmen's Hospital, Washington, D. C., during the past sixteen months, and are deemed sufficiently interesting to be placed on record:—

CASE I. *Aneurism of right primitive carotid*.—George W., aged 25, admitted Dec. 2, 1866, with hemiplegia of left side, the result, he states,

of blows on the head, received in a drunken brawl a few days previous; no cut or bruise or depression, however, could be discovered on any part of the head. The mouth was drawn to the right side, and the tongue protruded to the left; partial ptosis of right eyelid, and total blindness of the right eye (not aware of it until to-day, July 9). Improved slowly but steadily, and in a little more than two months was able to walk about the ward and hospital grounds. No improvement in the affected arm for a considerable time afterwards, but can now raise his left hand to his face.

The aneurism was first noticed about the middle of April, and, on being questioned, he says that he felt the pulsation and became aware of it the first week in March. It increased in size rapidly, interfering materially with deglutition, and pushing the larynx nearly an inch to the left of the median line; the pressure of the tumour also gave rise to a loud stridulous cough, which annoyed him almost constantly. During the two weeks preceding the operation he complained of pain in the tumour, at times very severe, headache, and loss of appetite, and was obliged to keep his bed. Pulse 120.

At 6 P.M., May 22, 1867, I applied a ligature to the right common carotid, just below the omohyoid; loss of blood trifling, not exceeding two or three drachms; the edges of the incision retained in apposition by adhesive straps; no sutures or compress applied.

May 23, 8 A.M. Pulse 128; breathing slightly stertorous; inclined to sleep; pain in the tumour not very great; no headache; cough continues, but not much expectoration; slept well during the night. 8 A.M. Pulse 110; no change otherwise; deglutition painful, the same as before the operation; respirations 20.

June 2. Pulse 114; feels perfectly well; tumour apparently softer, and lessened somewhat in size.

3d. Pulse 116; respirations 20; ligature came away this morning; no hemorrhage; improving steadily.

6th. Pulse 100; improving every day; able to walk about the ward and grounds.

9th. The tumour is diminishing slowly in size, and is softer; no pain or uneasiness in swallowing; cough continues, but is not so severe; the larynx is not so far to the left of median line as before the operation; and, so far as the operation is concerned, the man is well.

July 10. No record was kept after above date; a slight discharge continues; the tumour is still somewhat prominent, but is much smaller than at the time of the operation, and softer. The larynx is slightly to the left of the median line, but the displacement is not marked.

March 18, 1868. Examined this patient to-day, and found that the aneurismal tumour had been entirely absorbed, and that he has so far recovered from his paralysis as to resume work.

CASE II. *Femoral aneurism*.—Hilley J., aged 30, admitted to hospital April 15, 1867, with aneurism of left femoral at inferior third; tumour at base about four inches in diameter; result of gunshot wound received three years ago; the bullet had never been removed, and could be felt upon the anterior surface of the tumour.

May 8. Digital pressure was applied to the femoral artery for about two weeks, but failed, probably through want of skill on the part of the attendants, although the pulsation in the tumour was sensibly weakened. The ligature was applied about two inches below the profunda, and the incision

closed by adhesive straps, no sutures being applied; no diminution of temperature in leg or foot; very slight numbness on the outside of the knee; no unfavourable symptoms of any kind, more than would follow a simple incision of the same extent. On the tenth day slight hemorrhage occurred, and on the three or four following days, sufficient only to discolour the discharge; a little thickening and soreness in the line of the femoral. On the nineteenth day the ligature was removed. At the end of the fourth week the patient left the ward, able to walk with the assistance of a cane.

June 12. Discharged at his own request, quite well; tumour considerably diminished in bulk, but still quite prominent.

CASE III. Popliteal aneurism.—John C., labourer, aged 35, admitted to hospital Oct. 9, 1867, with popliteal aneurism of right leg; had existed about one year. The tumour diminished in size during the first week after admission, but still hard and tense; is most prominent at a point opposite the bifurcation of the popliteal artery; pulsation evident, but not very strong; a blowing sound present, but not well marked—requires to be listened for carefully; the whole calf of the leg appears to be enlarged and hard; sensation in the foot is impaired, especially along the outer side, and complains of almost constant pain in the tumour and also in the foot, the pain in the latter being referred to the ball of the foot, and occasionally to the heel.

Oct. 23. I applied a ligature to the femoral in its lower third at 4 P.M.; very little difficulty experienced in the operation, the vessel being found almost immediately; not above two ounces of blood lost.

24th. Pulse 96; feels quite comfortable; warmth of leg and foot normal; he thinks the pain is not so great as before the operation; complains of some pain in the knee-joint, inner side; numbness of the foot about the same. Ordered a light nutritious diet.

31st. Pulse 96; less pain than usual; edge of incision agglutinated together; not a drop of pus has made its appearance so far.

Nov. 1. Pulse 100; feels better in every respect; appetite good; less pain; sensation in foot is improving; no suppuration yet; applied a tourniquet loosely to the femoral, as a matter of precaution.

2d. Pulse 100; the incision apparently united in its whole extent; after some manipulation, some three drops of pus escaped at the point where the ligature emerges.

3d. Pulse 100; complains of pain in the wound, extending upward to Poupart's ligament; removed the dressing, when about two ounces of offensive pus escaped; the ligature appears quite firm; sensation in the foot is improving; no other change worthy of note.

4th. Pulse 96; considerable suppuration, mixed with sufficient blood to colour the pus a deep red; some pain.

7th. Feels quite well; there is occasionally some pain in the knee, foot, or leg, but is not so constant as formerly.

10th. Ligature still immovable; slight traction is made upon it every morning; sensation in the foot improves steadily, but the tumour is yet quite firm, and decreases in size very slowly.

15th. No special change since last report; the ligature yet remains; suppuration moderate, and not coloured; for the last week appetite good; appears to be perfectly well; slight changes occur from day to day; pain complained of frequently, generally referred to the heel or ball of the foot.

23d. Ligature came away this morning; no hemorrhage; slight thickening or hardness can be felt in the line of the incision; tumour still large, but not so hard.

28th. Hemorrhage from the wound occurred suddenly last night about one o'clock, to the extent of one pint, the patient thinks, but probably it did not exceed six or possibly eight ounces. The tourniquet was tightened, a compress and bandage applied, and the hemorrhage ceased. This morning, directed the limb to be well raised, the shoulders lowered, and the tourniquet to be left perfectly loose, so as to interfere as little as possible with the return of the blood through the superficial vessels.

29th. No return of the hemorrhage, and appears none the worse for the loss of blood.

30th. No change; suppuration moderate in quantity; is required to keep perfectly quiet.

Dec. 10. No record has been kept since Nov. 30; the patient is improving rapidly; is now allowed to sit up; the discharge is slight, and the incision nearly healed over; sensation in the foot is almost as perfect as in the other, but numbness about the ball of the great toe is still complained of. The tumour has changed very much during the last ten days; it is now quite soft, and very much diminished in size. The change is more apparent when the leg is partly flexed upon the thigh.

15th. Continues to improve; is anxious to be allowed to go home; suppuration from the wound is barely sufficient to stain the cloth applied to it; pain in the tumour and in the heel recurs, but it is slight and usually of short continuance; sensation is not yet entirely restored in the ball of the great toe, but it is probable the patient would scarcely notice the feeling of numbness if his attention were not called to it, or had he anything else to occupy his mind.

17th. No special change since last report; experiences some difficulty in walking, for the reason that during the past year the leg has been kept almost constantly in a semi-flexed position, the flexors are consequently a little contracted.

19th. Discharged cured.

CASE IV. *Femoral aneurism*.—Charles W., aged about 50, admitted to hospital from station-house, Jan. 10th, 1868. Is insane, talkative, and troublesome, but not violent; has an aneurism of right femoral artery, upper third; the tumour is about four inches below Poupart's ligament, and nearly the size of a closed fist. The whole limb is œdematous, the œdema extending up to and even beyond the tumour, which is itself œdematous; the pulsation is strong, the blowing sound well marked and somewhat harsh in character. He says he received a kick in the groin about two months before admission, and that the tumour made its appearance immediately afterwards; no reliance, however, can be placed on his statements. Considering the unfavourable character of the case, the location of the aneurism, and the insanity of the patient, it was resolved to try digital pressure, which was continued for one week, beginning January 15th, but with no result. It was next to impossible to induce him to submit to such a degree of pressure as would suffice to cut off the current of blood from the tumour.

On the 18th, a small abrasion of the cuticle was observed on the most prominent part of the tumour, and in the course of the next three days a small ulcer formed, about the size of a nickel cent, from which oozed a few

drops of bloody fluid, and, by the 22d, the quantity increased sufficiently to soil three or four inches (square) of the bed clothing, and some fears were entertained that the tumour would give away.

On the 22d (in order that the patient should have every chance before an operation was resorted to), he was placed under the influence of ether, and a tourniquet applied, as near Poupart's ligament as convenient—thus cutting off the circulation effectually, with the expectation that coagulation would take place in the tumour. Pressure was steadily maintained for two hours and a half, both above and below the aneurism, but as soon as the tourniquet was loosened pulsation returned, apparently undiminished in the least. It was evident that an operation had become absolutely necessary to save the man's life, as, judging from appearances, the tumour might give away at almost any moment.

On the 23d, I ligated the femoral artery about two inches below Poupart's ligament, in presence of Drs. Eliot, Lieberman, Bond, and students. Upon applying the ligature, the vessel gave way and the blood welled up, filling the wound faster than it could be sponged out, and for a moment it seemed that the patient might possibly die under our hands; firm pressure with the finger upon the artery, at the point where it emerges from beneath Poupart's ligament, checked it for a few moments, until it was effectually stopped by one of the students pressing upon the abdominal aorta, about the point of bifurcation, and a little to the left of the median line; hardly a drop of blood was lost afterwards. A ligature was then applied close to the ligament, where the vessel appeared healthy, and another one to the diseased portion, as close to the tumour as the extent of the incision would permit. Although the hemorrhage was quite profuse for a few seconds, the quantity of blood lost could not have been very great, as the pulse was not affected by it.

January 24, 1868, 9 A. M. Pulse 100; passed a quiet night; he has been much quieter since ether has been administered on the 22d; cannot detect any difference in the temperature of the two limbs, although immediately after the ligature was applied to the artery, it was thought that the leg was warmer than the sound one. Bowels moved in bed this A. M., a common circumstance, I believe, before the operation; light, nutritious diet, beef, etc.; limb wrapped in woollen blankets. Afternoon: Pulse 96; no change, urinates in bed habitually, the dressings are saturated with urine a great part of the time, no desire for food, but drinks beef-tea very freely.

25th. Pulse 96; slept well; more talkative than yesterday; dressed wound; discharge slight; leg and foot warm.

26th. Pulse 88; rested well last night; appetite improving; limb warm, toes cool, but not cold; sensation perfect. The tumour is nearly the same size, but it is softer; the point of threatened rupture has scabbed over or dried up. Suppuration slight, but the wound is somewhat irritated by the urine; extra precautions have been taken to keep the parts dry.

27th. Pulse 84, of fair volume; limb warm; the wound is now kept free from urine by keeping the penis hanging in a urinal and emptying it frequently; but the bowels are generally moved in bed, so that great care is required to keep him clean. He is much quieter and more manageable than before the operation, and appears anxious to recover; has less pain in the tumour, and is less restless, probably for that reason; the scab has come off the ulcer, and it is now a little larger, nearly or quite an inch in diameter.

28th. Pulse 92; limb warm; rested well last night; appetite good, feels very well; ulceration larger; discharges bloody matter, and looks as though it may open at any time; great difficulty in keeping him clean and dry.

29th. Pulse 88; suppuration from the wound increased, also from the tumour; the discharge from the latter bloody, no pain; he says that he feels quite well, eats well, and drinks beef-tea abundantly.

30th. Pulse 88; no special change; a small ulcer has made its appearance upon the outer surface of the tumour, about half an inch from the large one; is superficial; nearly all the discharge, blood, etc., comes from the larger one, and its odour is offensive.

31st. Pulse 88; the suppuration is quite free from the incision, but is not coloured; this morning a considerable quantity of bloody matter and coagula escaped from the large ulcer in the tumour, 3iij or more. The ulcer has probably reached its cavity.

February 1. Pulse 80 and feeble; had some hemorrhage last night from the opening in the aneurismal sac, a little from the incision; the amount must have been considerable, but it is impossible to make any estimate of the quantity. The nurses did not send for me when it began, and when about to do so the bleeding ceased. He shows the loss of blood this morning; pulse weak and very restless. 3 P. M. Hemorrhage recurred about half an hour since, checked in a few minutes by the free application of persulphate of iron. As soon as the bleeding ceased, I applied a ligature to the femoral, in the middle third, four or five inches below the tumour; after the operation pulse 80, stronger than this morning. When fairly under the influence of the anæsthetic the pulse became very weak; the sponge was immediately removed, and in a few minutes it improved in volume. 9 P. M. Pulse 80 and fair; is very restless, constantly tossing his arms about; no hemorrhage since last record; strong beef-tea and whiskey punch ordered.

2d. Worse this morning; pulse barely perceptible, very restless, and unable to talk plain; is delirious; slight hemorrhage occurred about 12 o'clock last night, but the nurse stopped it with but little difficulty, by the application of the persulphate; the loss of blood must have been trifling, but he has none to spare; cannot get him to swallow anything. 6 P. M. Pulseless, no hemorrhage, about the same otherwise; evidently dying; cannot induce him to drink anything; if it is put in his mouth he spits it out.

3d. Died at half-past 12 o'clock last night.

Post-mortem examination made fifteen hours after death.—Considerable fluid escaped upon the removal of the calvarium; dura mater adherent at several points along the median line. Right lung adherent at apex, otherwise both lungs unusually healthy. Heart: pericardium firmly adherent at all points; could not be separated without careful dissection; weight of heart $18\frac{1}{2}$ oz. No examination of the chest had been made during life. The tissues around the tumour and incision were infiltrated with pus of a dirty gray colour, and very offensive; found a clot in the artery above the first ligature; none of the ligatures had separated; when hemorrhage occurred the blood must have come from below; found an opening in the femoral artery near where the profunda is given off; this opening was filled with a large coagulum, and a larger mass was found outside.

Remarks.—The case of George W. (No. 1), above reported, was, when considered in either its medical or surgical aspects, one of remarkable interest. This man, on admission into the hospital, was found to be suf-

fering from hemiplegia of the left side, and facial paralysis as before described. He was placed under appropriate treatment for three months, and he slowly but steadily improved. At the end of that time the aneurism of the carotid was first noticed, and as is usually the case, after attaining a certain magnitude, it grew quite rapidly, and at the time of the operation had attained the size of a hen's egg. The interesting point to be decided was, what connection (if any) existed between the aneurism and the hemiplegia; and I am of opinion, after a careful study of the phenomena presented in this case, that the same condition of the primitive carotid which preceded the formation of the aneurism also existed in the other bloodvessels of the body, and was the predisposing cause of the hemiplegia.

Excluding traumatic causes, the most common cause of aneurism is generally admitted to be an atheromatous degeneration of the arterial coats. Now, if we will suppose this to be not a local disease, but one which generally exists in a number of the bloodvessels at the same time, we will have reason to infer that either the excitement, or the blow received, sufficed to rupture the weakened coats of one of the bloodvessels of the brain in this patient, and caused the formation of a clot, which produced the symptoms above mentioned. This view of the case is strengthened by the gradual improvement which took place in the condition of this patient, and which was probably coincident with the gradual absorption of the clot.

In two of the cases above mentioned the pressure treatment (by the old method) was thoroughly tried, but failed to cure. I feel perfectly satisfied, however, that though the pressure failed as a curative measure, yet it was very beneficial in these cases, for the reason that it assisted very materially in establishing the collateral circulation. It will be noticed that the circulation in every case was rapidly and thoroughly established, and there can be no reasonable doubt that this was in a great measure owing to the gradual enlargement of the arterial branches given off above the point at which the main arterial trunk was ligated, during the time that the pressure was being applied.

In the case of the aneurism of the primitive carotid (Case I.), pressure was not applied, as it was obviously impracticable; indeed, the slightest pressure, or even touch, upon the aneurismal tumour, produced violent paroxysms of stridulous coughing, and interfered seriously with respiration and deglutition.

In Case IV. (Charles W.) it will be noticed that the old method of gradual pressure was tried, and, after that had failed, the new method by quick pressure, so successfully used in Europe recently for the rapid cure of aneurism, was resorted to, but without any satisfactory result, and we were compelled to resort to the ligature.

Finally, in reviewing the history of the above cases, it will be observed that they confirm in the strongest manner the teachings of the later

authorities in surgery, and which are to the effect that we should always, when possible, try pressure before resorting to the ligature in the treatment of aneurism.

ART. X.—*Case of Muco-Periosteal Uranoplasty.*

By WM. R. WHITEHEAD, M. D., of New York. (With three wood-cuts.)

I WAS recently induced to undertake a very careful examination of the subject of uranoplasty from the gradually increasing interest which the following case elicited; and which, having been peculiarly instructive, its history may be worth recording.

CASE.—At a meeting of the New York Medical Journal Association, I exhibited a patient with cleft palate, as one in which an excellent result had been obtained simply by staphylorrhaphy. Subsequently Langenbeck's operation of muco-periosteal uranoplasty was performed.

Properly speaking, this case was not one of cleft or fissure, but a congenital absence of the palatine vault, with only a rudimentary development of the palatine muscles on each side of the throat. The broad bony chasm, through which were plainly visible the vomer and inferior turbinated bones, extended forward to the gums of the front teeth, and was originally seven-eighths of an inch by measurement in its widest part; but the open space between the atrophied palatine muscles was more than an inch. The patient, a lady, aged about twenty-five years, had worn for several years a metallic obturator which accurately closed the fissure in the hard palate, rendering her efforts at speech and deglutition less painful, but it was evident that so long as there remained a cleft of the velum palati the degree of improvement in speech would be inconsiderable. Desirous, therefore, of uniting by suture, even should it be to a very limited extent, only the cleft of the soft palate, which I considered would increase the usefulness of the obturator, I operated about the first of last July, dexterously assisted by Dr. R. O. Mason, of this city. At that time there was obtained only a partial union of the parts which I attempted to unite, the upper sutures having cut out on the first day; this was due to incomplete division of the levator palati muscle on one side. However, the slight improvement in speech which followed made her desirous to have the operation repeated, and this was done on the eighth of the following month. The palato-glossus and palato-pharyngeus were successively cut on each side as previously, but the precaution was taken to sever low down and very thoroughly the palato-pharyngeus. The levatores palati were divided according to Sédillot's method, using for that purpose sharp and probe-pointed tenotome knives. The sharp-pointed knife being passed immediately to the inner side of the hamular process on each side, through the rudimentary and atrophied velum palati, held tense by a pair of forceps, the levatores palati were cut, as were also the reflected tendons of the tenosores palati. Sartiù's canulated needle, modified by Tiemann, containing silver wire was used, but at the third suture the instrument got out of order, and Sim's needles and forceps were used.¹

¹ Mr. Tiemann has quite recently simplified and very much improved his instrument.