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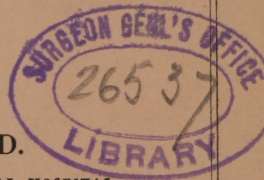
LIGATURE  
OF  
BOTH CAROTID ARTERIES  
FOR A  
REMARKABLE ERECTILE TUMOR  
THE MOUTH, FACE AND NECK.

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BY J. MASON WARREN, M. D.

ONE OF THE SURGEONS TO THE MASSACHUSETTS GENERAL HOSPITAL.

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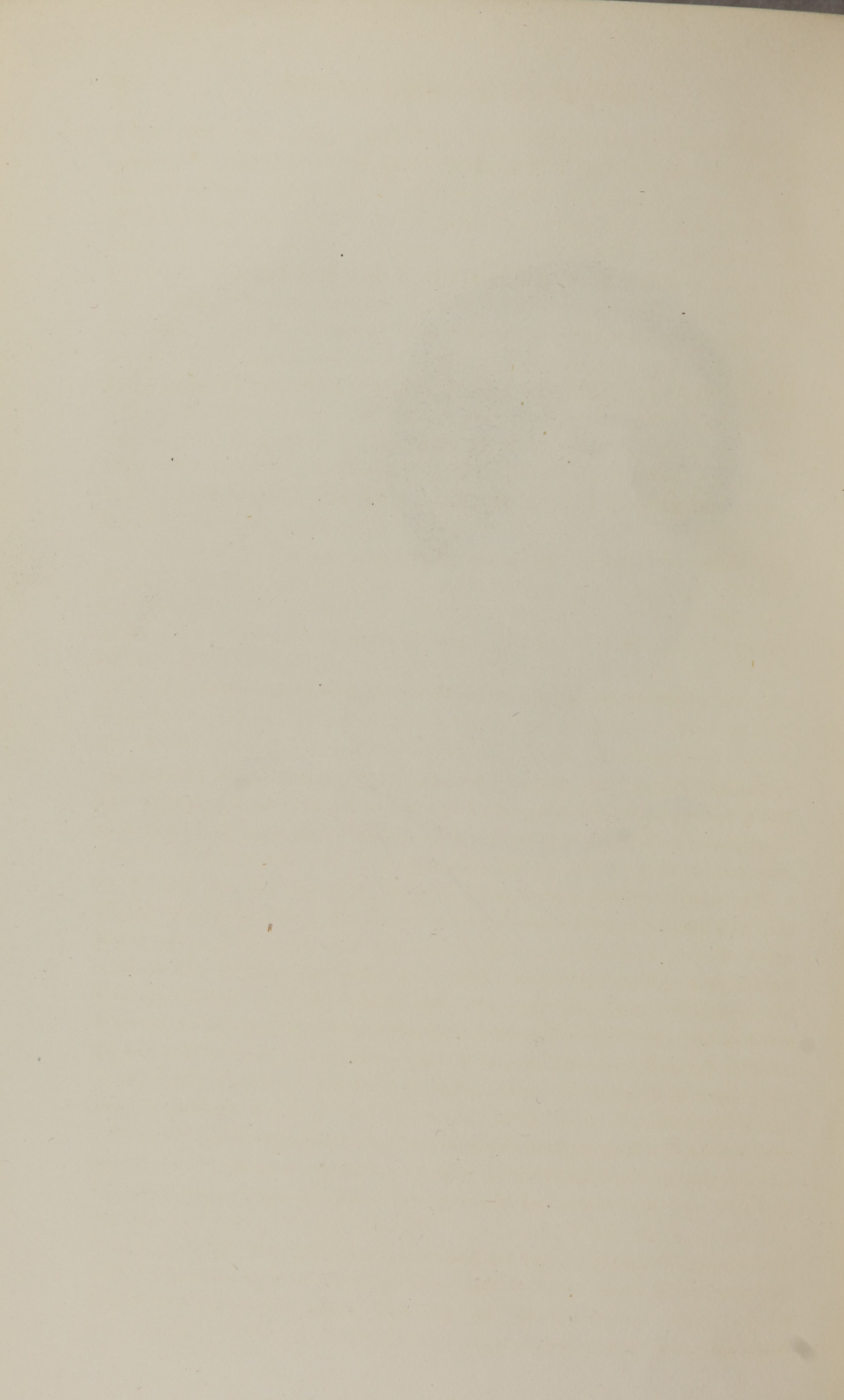












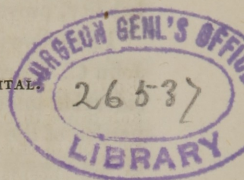


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WITH TWO PLATES.

[From the American Journal of Medical Sciences for April, 1846.]



ALBERT TABUR, from Maine, 23 years old, consulted me on October 1st, 1845, for an enormous tumour of the lower lip and tongue, which had supervened on a mark occupying a good part of the face, and neck, and now presented the following appearances.

The head of the patient was larger than common: the left side of the face was almost wholly occupied by a discoloration, which was originally less extensive and lighter coloured, but had now attained the extent and appearance above mentioned. The right side presented a discoloration about half the extent of the left. The lower lip was much enlarged, everted, and gave three aspects: externally, the thick tumefied lip; internally, a fungoid tumour, covered by red granulations distended by blood, as if ready to break through; the whole surmounted by an irregular ulceration with thickened edges and a hardened base. The red granular appearance extended underneath the tongue through the ranular space to the inferior surface itself, the left half of which was enlarged to double its natural size and partially protruded between the teeth; its upper part being the seat of five or six small ulcerations. The discoloration of the face also extended on the outside of the lip downwards over the chin and neck, covering a space of seven or eight inches in diameter, as represented in Plate I; the whole, especially that on the face, being rather more full and distended with blood than natural.

The history of the case was this. The mark, as above stated, was congenital. About four years since the lip and tongue began gradually to swell, and the former very shortly ulcerated. The ulceration has occasionally healed since that time, until the last year, when it has been permanently enlarging. On making pressure on the lip the blood can be gradually expelled, returning again immediately on the pressure being withdrawn. The same is the case with the tongue. Since the erectile tissue has been developed in the lip the discoloration of the face has become more marked, has extended, and is evidently partaking of the character of the erectile tumour in its neighbourhood.

This case was evidently a very critical one, and the two most prominent dangers which appeared to threaten him were these: First, a cancerous degeneration of the ulcerated lip; and, secondly, alarming hemorrhage, which was likely sooner or later to take place, and which must, in all probability, prove rapidly fatal.

The following is the course I proposed to him, in consultation with Dr. John C. Warren: 1st, to have the left carotid artery tied; 2d, after a considerable interval of time to tie the right carotid; 3d, to attack whatever portion of the tumour remained by means calculated to produce contraction of the vessels and obliteration of the erectile tissue.

To this course, after weighing well all the dangers connected with it, the patient agreed, and on Oct. 5th I tied the left carotid artery. He recovered from the operation, and was out in about ten days. At that time the face had become more pale, the erectile tissue and the large tumour of the lip had very much diminished in size, and the painful ulceration which surmounted it was rapidly healing. The patient seemed to be in perfect health. He was advised to go home, remain three or four weeks, and then return to have the other carotid tied: in the meanwhile to apply a strong solution of the sulphate of zinc, by compresses, to the inside of the lower lip.

*Nov. 7th.*—When the patient returned from the country, it appeared that the tumour of the lip was diminished one half. The fullness of the face and neck was less; the discoloured parts were much paler than when he left town. The size of the tongue was less, and the ulcerated spots on it had quite healed. His health remained good. It was determined, therefore, to proceed at once to the ligature of the carotid of the right side.

The day previous to the operation, I made a compression on the artery for about five minutes without any obvious inconvenience to the patient, and with much encouragement to myself as to the event of the next operation.

The patient being placed in a sitting posture, the carotid artery was laid bare, and a ligature passed under it. It was dilated about one-third more than its natural size. He was then placed on his bed, with the head slightly elevated; the state of the pulse was now explored, and found

to be 80 in the minute. The ligature was drawn tight. At first he exhibited no change, but shortly after the pulse appeared to labour, and became slightly irregular; the only symptom noticed in the patient was that he became drowsy. After waiting about fifteen minutes the second knot was tied, and the wound dressed.

No inconvenience was experienced from this operation, farther than a slight faintness during the afternoon on attempting to raise his head. He was directed to keep perfectly quiet, and to maintain strictly the horizontal position.

On the third day there was a slight soreness about the larynx, which lasted three days. He is now, Nov. 19th, at the end of ten days, in good health, and able to go down stairs. The face is much paler than before the last operation, and the morbid appearances are diminishing.

*Nov. 26th.*—The ulceration of the lip is quite healed; but the lip itself is still thick and somewhat everted by the erectile tissue, which enters into its whole substance.

On examination of the part it was concluded that although this swelling was gradually diminishing, yet it would not wholly disappear without a further operation; and that, as the patient lived at a considerable distance, the disease, if disposed to return, might get beyond control before the proper remedies could be applied to check its increase. I therefore determined to remove the diseased portion of the lower lip by a V-like incision. Previously to this, and in order to avoid hemorrhage, I performed the following operations.

A cataract needle was plunged into the vascular texture on the left side, and carried in different directions, so as to break up and destroy its organization. No hemorrhage followed this application. Three days afterwards a similar operation was repeated on the right side.

*Nov. 29th.*—A final operation was performed. A strong compression being exercised by means of two steel forceps prepared for the purpose, on each side of the lip, so as completely to interrupt the course of blood into it, a portion not less than two inches in length at its free edge was removed by a triangular incision. At first there was not the slightest hemorrhage, the two lips of the wound remaining perfectly dry; on the compression being removed, however, blood gradually oozed from the whole cut surface. This was easily checked and the edges of the wound approximated by a number of points of the interrupted suture, and a powerful compressing bandage applied.

For the first twenty-four hours he was carefully watched. Towards evening a coagulum was found projecting from the wound, which was removed. From this time there was no farther hemorrhage, or bad symptom, and the wound healed by the first intention.

The portion of lip removed presented a spongy tissue, like the body of

a leech, and gave a sensation in cutting like a bit of diseased lung,—parts of it were indurated from the previous subcutaneous incisions. The muscular tissue had almost completely disappeared.

*Dec. 12th.*—The patient returned home quite well. Previous to the last operation, and after the ligature of both carotids, he was present at a meeting of the Boston Society for Medical Improvement, and on the day he left town he was seen by various gentlemen of the profession.

At this period the drawing, Plate II, was made. As will be seen, the discoloration of the face had become much paler, and that of the neck and chest had almost wholly disappeared. The ear had lost its swollen and deep reddish colour, and had become of a natural size and of a pale aspect.

No pulsation could be discovered in either of the temporal arteries, or in fact, in any of the arteries of the head. In the neck, just above the clavicle, two large arteries nearly the size of the carotids, are seen pulsating powerfully under the skin, being in all probability the supra-scapular arteries greatly enlarged.

I have had a letter from this patient since his return home, and he is now, Feb. 1st, nearly four months after the first operation, in the enjoyment of perfect health, nor has he had the slightest indications of disturbance in the brain from this great interruption to its natural circulation.

*Remarks.*—It is now rather more than forty years since Sir Astley Cooper first applied a ligature to the carotid artery for aneurism, and the operation at that time was looked upon with great distrust from the fear of a fatal disturbance to the functions of the brain. It has since been frequently repeated, and with as good success as perhaps any of the greater operations in surgery.

It remained to be proved, whether both carotids could be safely tied without destruction to life. One case in this country, performed by Dr. Mussey, in 1827, and two or three abroad, go to prove the practicability and safety of this operation, if done with proper precautions. The great object appears to be, that sufficient time should elapse between the ligature of the carotids to allow the collateral vessels which supply the brain to be dilated, so as to carry the quantity of blood required for the performance of its functions.

In Dr. Mussey's case, the second ligature was applied at the end of twelve days, and without any uncommon symptoms on the part of the patient. Eight years afterwards he was well, although occasionally troubled with cerebral plethora.

Professor Kuhl, of Leipsic, tied the left carotid artery in a man 53 years old, for the cure of an extensive aneurismal disease of the scalp. This patient had convulsive motions and vomiting during the operation. A profuse hemorrhage from the tumour rendered it necessary to secure the right carotid artery on the 41st day. The patient recovered, but not until after

hemorrhages from the tumour, and suppuration, and considerable trouble in the cerebral functions. Two other cases have been given by the *London Medical Gazette*, as performed by Mr. Preston, of India, for some disease of the brain. In one case the second ligature being applied at the end of eleven weeks, and in the other at the end of four weeks. In these cases, although the condition of the patient was not improved by the operations, no severe symptoms on the part of the brain followed the obstruction of the blood through these vessels.

Other cases may be adduced, in which both carotid arteries have been obstructed by disease, such as aneurisms, or other tumours in their neighbourhood, without destruction of life. These show, that if the nature of the case forbids a resort to any of the other resources of surgery, this operation offers a reasonable chance of success and safety to the patient.

To the cases that are mentioned of partial obstruction of the vessels supplying the brain, the following very interesting one, in which all the large vessels going to that organ were cut off, is given by Dr. Davy.

“The subject of this case was an officer of high rank, about 55 years of age, who first began to suffer in health after an attack considered to be rheumatism, in 1831. In Sept., 1835, he was taken suddenly ill, with a tendency to syncope and vertigo, frequently returning; but after this his general health grew better; he experienced vertigo seldom, and syncope never. It was now observed, that he had no pulse at either wrist, or in the brachials. His disease was now clearly perceived to be aneurism of the arch of the aorta, with an obstructed state, it might be inferred, of the great vessels arising from it, for no pulse could be felt anywhere in the course of those vessels, in the neck, temples, axilla or wrist. This gentleman expired suddenly, while traveling, on Jan. 11th, 1837. Upon examination of the body, the aorta was found ruptured near its base, within the pericardium. The arch of the aorta was the seat of a large aneurism filled with coagulum. All the great vessels arising from the arch were completely closed up at their origins. The upper portion of the innominate was open; the right carotid and subclavian were also open, but rather diminished in size; the left carotid, subclavian and vertebral arteries, as far as they were examined, viz., to the extent of two inches, were impervious, being plugged up with lymph. The intercostal arteries were observed to be large.”—*Lond. Med. Gaz.*

Having shown by facts the ground on which an operation of this kind is practicable and of a reasonable application, we are led to look at the propriety of adopting it in the present case.

It was evident, in the first place, that the patient's fate was inevitable either from cancerous degeneration or hemorrhage, or both combined, unless some sure and active means were adopted to arrest the disease. If the disease had been situated at a great distance from the vessels to be ligated, on the scalp, for instance, there would have been a question, as

will be shown by a case in the sequel, whether the supply of blood might not be kept up by a collateral supply through the vertebral arteries, by means of the ophthalmic. In the present case no danger of this kind was likely to give cause for immediate apprehension, and the active part of the disease might easily be extirpated before the anastomosing vessels from other quarters had begun to supply the tumour,—an opinion supported by the event.

The attempt to remove the lip without the ligature of the carotids, would probably have been attended with fatal hemorrhage, and even if the patient had escaped this accident, it would have left much diseased tissue remaining.

I have, however, twice attempted this operation in aneurism by anastomosis of the upper lip, where the disease has been partial. One of these cases is described in Dr. Warren's work on Tumours. The individual had a large red mark occupying nearly one-half of the left side of the face. During his childhood the upper lip on that side had commenced enlarging, until it had finally formed a permanent tumour, hanging down and obscuring the under lip; the gums had partaken of the disease; had become spongy, and with the rest of the diseased mass were bleeding on the least injury. About two-thirds of the upper lip was affected. I removed the whole of this by means of two incisions made in the adjoining sound textures. A triangular piece being thus included, a number of dilated vessels, which supplied the erectile tissue, were tied, and the only hemorrhage which was troublesome arose from the angle of the wound, where the disease had extended up into the nostrils. The inflammation which supervened on this operation was sufficient to obliterate the morbid tissue, which extended about the mouth and in its neighbourhood. Three months afterwards almost exactly a similar case of disease presented itself to me on the right side of the face, which was successfully treated in the same manner.

The following case, treated conjointly by Dr. John C. Warren and myself, confirms the remarks with regard to the ligature of the carotids, and also possesses many other points of interest.

*Remarkable case of aneurism by anastomosis successfully treated by various operations.*

The subject of this case is Asa Porter, an inhabitant of Nova Scotia, a healthy man, ætat. 33. He has on his forehead, principally below the roots of the hair, a little to the right of the median line, a soft, pulsating, irregular tumour about three inches in diameter, and from a half to three-fourths of an inch in thickness, which gives him a very formidable aspect.

This tumour is of a reddish colour, becoming redder and larger when the patient is excited, either by bodily exercise, or mental disturbance. It appears to consist of coils of vessels. It is easily compressed, and on

removal of the pressure immediately enlarges again. A number of pulsating blood-vessels are seen to enter it from different directions, principally on the right side. Of these may be distinguished, first, the temporal artery, which is in a very enlarged and tortuous state as far down as the lower part of the external ear; second, a branch of the temporo-frontal artery; third, the facial or angular artery from the internal commissure of the eyelids. On the left side are seen the left temporal artery, which is nearly as large as the right, and the left facial artery, which with its fellow, the artery of the right side, and its accompanying veins, forms a vascular tumour at the root of the nose. The veins themselves are of an enormous size, passing down from the tumour on either side of the nose, covering and partially obscuring the internal commissure of the eyelids. Besides these vessels, the whole scalp in the neighbourhood of the tumour seems alive with smaller arterial trunks, which are seen pulsating in every direction.

On compressing the temporal arteries, pulsation in the tumour is much weakened, and when, in addition to these, the facial arteries are also compressed, pulsation ceases, and the tumour becomes flaccid.

This tumour began sixteen years ago, without any known cause, by a small reddish spot on the right side of the forehead. It has gradually increased till lately, when this increase has been more rapid, especially within the last fortnight. There is an occasional throbbing of the carotid arteries, particularly that of the right side. The patient is also subject to distressing headaches, accompanied with increased action of the blood-vessels of the tumour, and of the head generally. This vibratory action of the arterial system of the head, neck and upper extremities is quite remarkable. He is incapacitated by it from all active exertions, and is therefore ready to undergo any operation that promises to relieve him.

The course of this tumour, if not arrested by surgical treatment, can be readily foreseen. The morbid action will gradually involve other vessels, until the whole scalp becomes filled with enlarged arteries. The vessels of the eyelids, of the face generally, and even of the interior of the mouth, are likely to be involved in this diseased action. The patient's condition will, in this way, become almost insupportable, and his life will, perhaps, be hazarded by the rupture of the tumour, which now seems almost ready to take place.

What means should be adopted to arrest its progress? Those which naturally present themselves in the first place, are of two descriptions:—First, ligature of the carotid artery. But in this case the ligature of a single carotid might not suffice to arrest the flow of blood into the tumour, since the vessels which supply it, although principally from the right, are partly from the left carotid. The ligature of both carotids would therefore be necessary; but the result was less likely to be successful than in the preceding case, on account of the greater distance of the tumour from the

arteries tied, and from the probability of its having other means of supply through the vertebral arteries, which inosculate freely with the branches of the internal carotid, the ophthalmic in this case being unusually dilated. The second mode of operating which suggests itself, is to expose the different vessels supplying the tumour, and pass a ligature upon them. The objection to this course is the length of such an operation as the exposure of so many vessels would require. Are there any other means that can be devised besides these two? The tumour is much too large to admit the safe and effectual application of caustic. It cannot be cut out without the most dangerous hemorrhage. It is too large and too much connected with the bone to admit the application of ligature *en masse* in its present state.

*Oct. 31st.* Having compressed, on the right side, the temporo-frontal and two temporo-parietal arteries, and on the left side the continuation of the temporal artery through the frontal region, and the temporo-parietal, the pulsations of the tumour appeared to be arrested, and its contents were readily expelled through the large veins, running into the facial vein. Observing this we determined to interrupt the circulation through the five vessels first mentioned, three on the right side, and two on the left. Instead of exposing and taking up these vessels in the usual way, Dr. J. C. Warren suggested that much time and loss of blood would be spared by passing needles under them. This was accordingly done, and the arteries were compressed by a ligature thrown over the needles in the form of a figure of 8. After this the pulsation of the tumour was much diminished. Venesection was then performed, and the patient placed in bed with his head elevated.

*Nov. 6th.* The needles were removed. Very slight soreness had been experienced from them. The tumour is diminishing in size; the vessels constituting it appear more flaccid and compressible. The soreness and all the uncomfortable sensations connected with it are lessened.

*12th.* The pulsations in the right and left temporal arteries still continuing, a needle was passed under each of these directly above the ear, after which the pulsation subsided, and also the general sense of beating about the head. The patient is much more comfortable.

*21st.* In consequence of a slight bleeding from the wound of a pin inserted on the 16th, we thought it best to obstruct the vessels on the anterior, and on the internal part of the tumour, and passed pins in each of these situations. There is now no pulsation in the tumour; the tenderness existing on the upper part before any operation has been increased. He had a chill from going into another room in the house; since that has had some fever.

*22d.* At this date there was a sudden rupture of the tumour attended with considerable hemorrhage. Being hastily called to the patient, I passed two large pins at right angles with each other under that part of the tumour from which the hemorrhage was taking place. A ligature



was carried around under the needles, and being tightened, the bleeding was effectually checked. It was to be feared, however, that as the pins ulcerated out, the hemorrhage would recur. There being a want of accommodation in his lodging, and in order that he might be more carefully watched in case of a second rupture of the tumour, he was advised to go to the hospital, where he came exclusively under the care of Dr. John C. Warren, to whom I am indebted for the remaining history of the case.

*25th.* The pulse is now natural, 75; the internal sensations are much improved; there is no vibratory motion of the arteries of the head, and none is discoverable in the tumour, though a pulsation still exists. A slight œdema extends from the tumour to the nose, and to the eyelids. Occasionally a drop of blood starts from the needle wounds. From time to time leeches have been applied with great relief.

*30th.* On this day a vessel was discovered running from the left temporo-frontal artery across the left eyebrow, communicating with a branch in the angle of the eye on the right side, thence running up along the left edge of the tumour, till it reached its superior posterior border. It did not produce a pulsation in this part of the tumour, but skirting along its edge for some distance, as it did, there was a strong probability of its sending vessels into the morbid mass, thus tending to keep up the morbid action. The needles, which were inserted by Dr. Mason Warren on the 22d inst., caused an inflammation and induration of the tissue in their neighbourhood, and were removed without hemorrhage.

As compression of the artery rising on the forehead, checked the specified pulsation, it was determined to tie up this vessel. A needle was accordingly passed under it on Dec. 1st. Before placing the ligature, the vessel was compressed on the needle, without interrupting the pulsation along the edge of the tumour. Another needle was therefore passed under that part of the artery, where it penetrated at the superior internal angle of the tumour, embracing over the needle a vascular substance at least half an inch wide. A ligature passed in the figure of 8 over this needle, suspended all pulsation. The patient had some pain, which lasted a couple of hours, after which he became quiet, and suffered no longer.

*Dec. 3d.* Two needles have now separated from the substance of the tumour without hemorrhage. Besides the needle passed on Dec. 1st, there still remains one needle at the lower part of the tumour, which was passed under an artery from the right temporo-frontal. The tumour, which has been hard from inflammation is now softened; its heat, except near the needle passed the last time, has subsided. There is now no throbbing in any of the arteries about the head: the carotid beats naturally. The patient is tranquil, feels well, and sits up, which he could not do for some time on account of the throbbing in the head produced by any motion. He has a good appetite. His food is restricted, however, to half a pound of solid farinaceous matter per day, and about a pint and a half of liquid.

6th. Although all pulsations are at an end, the tumour still exists but in a diminished state. Dr. Warren thought that, if left to itself, it would in all probability disappear without further applications; but, as the patient lived at a great distance, it seemed to be a duty to see that the tumour was certainly and perfectly eradicated before he went home to Nova Scotia. The best mode of accomplishing this would be by the application of caustic, which, perhaps, might be resorted to now that the great vessels were cut off, without danger of hemorrhage. This day, therefore, the use of caustic was commenced by the application of caustic potash, in a solid form, to the wound left by the separation of one of the needles. This wound was about one inch long and two lines wide. A little blood followed the application, which might have arisen from the pressure of the caustic, and therefore a portion of the same substance, in amount eight grains, was applied in powder.

16th. The caustic has been applied three or four times. Twice a slight hemorrhage has occurred, requiring an intermission in its use. A pulsatory movement having reappeared in the relics of the tumour, the application of ice two or three times a day was directed, to be continued as long as the patient could bear it. To-day the caustic was reapplied to the ulcerated surface, which is about an inch long and half an inch wide. The tumour is sensibly diminishing in size.

It will be unnecessary to proceed with all the subsequent details of this case. It is sufficient to state that the different portions of the diseased mass which remained were successively attacked with caustic potash, and with the occasional application of croton oil. Any small arteries, which were discovered running into the tumour, were treated, as in the commencement of the case, by the needles.

On April 5th an operation was performed to excise a portion of the erectile tissue, which existed at the upper part of the wound, when a large vessel was opened and required a ligature.

May 20th.—After the wound from the incision and caustic was nearly healed, a fullness was perceived at its lower angle, immediately above the supra-orbital foramen. A triangular piece of the suspicious part was therefore cut out and the supra-orbital artery tied. The whole wound after this last operation was nearly the size of a dollar. Strips of adhesive plaster were applied to approximate its edges. The wound came together with great rapidity. In a fortnight after the last incision it was healed with a lunated cicatrix, and the parts appeared perfectly sound. The patient is in excellent health, and on this day, May 20th, was discharged to return home, promising to visit us occasionally when he came to Boston.

*Remarks.*—In considering this case the first circumstance which presents itself is its protracted and complicated treatment. The necessity of this arose from the obstinate character of the affection. The applications first made were insufficient, and additional remedies were required under

the various appearances which occurred. Four different measures were successively adopted.

1. The large vessels were interrupted by ligatures applied in a peculiar way, *i. e.*, by needles passed under the arteries, and compression made on them by a thread in the form of a figure of 8.

2. The ligatures being insufficient to repress the action of the smaller vessels, caustic applications were resorted to for the purpose of destroying the morbid texture, and in part obliterating it by the inflammation produced by the action of the caustic. To this end a very free application was made of caustic potash, and repeated between twenty and thirty times.

3. Excision was performed of the remains of the vascular texture, after the arteries supplying it had been so far obliterated as to remove the apprehension of hemorrhage.

4. Compression by adhesive plaster and a bandage had a sensible influence in finishing the cure.

The general treatment gave important aid to the local applications. The patient was kept very still, and for the greater part of the time in bed, with the head much elevated. His food was restricted to the smallest quantity, so that he was reduced for a time to a state of total prostration of the muscular power. During most of the treatment, if a small addition was made to his food, its bad effect was generally seen in the production of arterial vibrations and the recurrence of headache. Abstraction of blood, and the use of purgatives were resorted to when necessary.

It is worthy of remark, that while erysipelas prevailed all around this patient, he was never affected by it in the slightest degree during exposure of at least three months.

In conclusion, it may be said, that this affection could only have been destroyed by a resolute and active perseverance in the various remedies, continued through all the turnings of the disease.

BOSTON, *Feb.* 1, 1846.





