variable than is that of *B. welchii*. Experiment VII indicates, however, that it too may play a part in the causation of tetanus.

3. It follows from conclusions 1 and 2 that antibodies to the toxins of *B. tetani*, *B. welchii*, and *Vibrio septicus* should be included in all serum employed for the prophylaxis of tetanus.

4. While such a polyvalent serum promises to reduce still further the incidence of tetanus it would be too optimistic to assume that it would absolutely eliminate that disease, for infections other than those dealt with in this communication may also play a part in stimulating the growth of *B. tetani* in wounds. One of these, *B. oedematis*, I propose to investigate immediately.

REFERENCE.

¹ *Annales de l'Institut Pasteur*, January 1st, 1891.

ANEURYSM OF THE THIRD PART OF THE LEFT SUBCLAVIAN ARTERY, SUCCESSFULLY TREATED BY LIGATURE OF THE SECOND PART.

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IDIOPATHIC aneurysm of the subclavian artery is not common, and until recent years its treatment has been most unsatisfactory. Ligature of the first part of the artery is an operation of considerable difficulty, owing to the anatomical relations of the vessel and its depth from the surface, and in pre-antiseptic times was invariably fatal.

The second part, behind the scalenus anticus, has apparently not often been chosen for ligature; but it is far more accessible than the first part, and the operation is not especially difficult. In the case recorded below, I started the operation with the idea of ligaturing the first part, but found the second part could be more easily reached, and there was no difficulty in ligaturing the vessel. The result of the operation was completely satisfactory.

The patient, a farm labourer aged 50, was admitted into the East Suffolk Hospital on February 27th, 1918, complaining of severe pain in the left arm, which kept him awake at night. There was a pulsating oval tumour extending above the clavicle into the posterior triangle, rather smaller than a hen's egg. The left radial pulse was distinctly smaller than the right. The systolic pressure in the right brachial artery was 230 mm., in the left 195. The patient was kept in bed, given potassium iodide, and morphine at night.

Operation.

On March 8th, 1918, an incision was made along the posterior border of the sterno-mastoid, commencing at about its centre, and extending over the head of the clavicle for an equal distance on to the thorax; it was about six inches in length or rather less. The posterior edge of the sterno-mastoid was defined, the muscle drawn inwards, glands, etc., removed, and the internal jugular vein exposed. The attachments of the sterno-mastoid to the upper border of the clavicle, and of the pectoralis major to the lower border, were divided, and the inner half of the bone cleared with a periosteal elevator, the clavicle was divided with a saw, disarticulated at the sterno-clavicular attachment, and the inner half removed. The sub-clavius muscle was taken away and a large suprascapular vein; the subclavian vein was then exposed and cleaned. After removal of some lymphatic glands the scalenus anticus with the phrenic nerve was defined. It was evident that the aneurysm commenced at the outer edge of the scalenus anticus, and was confined to the third part of the artery. The first part had not yet come into view. The phrenic nerve was drawn inwards, the vagus, internal jugular, and internal carotid were also retracted out of the way, and the scalenus anticus muscle divided a short distance above its attachment to the rib.

The second part of the subclavian artery was now fully exposed to view. It appeared to be quite healthy and normal, and there was no difficulty in passing a ligature round it. Two silk ligatures of No. 4 silk were tied sufficiently tightly to occlude the vessel without rupturing the coats. Pulsation in the aneurysm and radial artery

immediately ceased. The wound was closed after suturing the divided sterno-mastoid and pectoral muscles, and a small drainage tube left in the centre of the wound. This was removed after forty-eight hours.

The patient made an uninterrupted recovery. The left arm and hand continued to be quite warm and free from pain. There was never any cyanosis or oedema. Muscular movements and sensation were unaffected. He left the hospital on March 28th, within three weeks of the date of operation.

I saw the patient again a month later—April 28th. He looked and felt perfectly well. All movements of head and arm were normal. He was quite free from pain and was advised to return to work. The radial pulse was still absent; the only trace of the aneurysm was a very small soft tumour above the clavicle resembling a lipoma. The systolic pressure in the right brachial artery was then 165 mm.

The operation has apparently been completely successful.

I am indebted to Colonel A. Carless for his kindness in giving suggestions as to the line of incision and *modus operandi*, and to my colleague, Mr. A. Y. Pringle, and Mr. Arthur Woo, the house-surgeon, for assistance during the operation.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

A CASE OF CEREBRAL TOXAEMIA— ? "BOTULISM."

THE following notes relate to a patient recently under my care. In the light of the interest lately aroused in the subject of botulism, and in consideration of the "epidemic" character of that disease, a report of this case, which occurred in Glasgow, may be suggestive epidemiologically. So far as I am aware, no case has, at this time, been recorded further north than Leeds.

Clinical Features.

J. G., male, aged 35, was admitted on May 6th, notified as typhus. His illness began on May 1st. The history, given by the relatives, was unsatisfactory, but headache, sickness, constipation, stupor, and delirium were the prominent features. The latter two appeared early, persisted throughout, and, as the disease progressed, tended to deepen.

On admission: coma, pyrexia (101–108° F.), sudamina or toxic erythema, dry brown flaccid tongue, bucco-pharyngeal hyposecretion, dysphagia, palatal paralysis, divergent strabismus, slightly dilated pupils reacting sluggishly to light, and retention of urine. Cerebral excitement was a prominent feature, producing muscular tremors greatly aggravated by interference. Forcible raising of the arms or separation of the legs revealed a spastic tone of the musculature. Movements constant, irregular, quick, choreoid (as in choreic diplegia), involuntary—although sufficiently purposive to necessitate restraint of the arms to prevent interference with catheterization. Sensation appeared hyperacute, as even slight digital pressure induced exaggerated collateral muscular response. Knee-jerks exaggerated, Kernig and Babinski present, ankle clonus indefinite. Heart: rate 120–144, sounds indefinite. Lungs: bronchopneumonic catarrh. Trace of albumin in urine. Abdominal examination negative.

Although, clinically, the case in no way resembled typhoid fever, the Widal reaction showed complete agglutination of *B. typhosus* in a dilution of 1 in 50 in an hour and a half.

Whereas, on admission, there appeared to be photophobia, next day paresis of both levatores palpebrae superioris was evident, and on the day before death there was bilateral ptosis with slightly contracted, fixed pupils. Bilateral facial paralysis was suspected, but could not be established on account of the profound stupor. Percussion over the chin and attempts at drinking produced a curious clonus of the masticatory muscles. The electrical reactions were not examined. Sixty hours after admission death occurred peacefully as from a gradual paralysis of the respiratory centre.

Post-mortem Findings.

Skin.—Over the shoulders, upper arms, and sides of thorax there were numerous small, circular, brownish spots, of variable size, some showing minute vesicular elevation. Over both suprascapular regions and backwards over the shoulders there was a copious eruption of sudamina.

Chest.—The left lung was intensely hyperaemic and oedematous. The right lung had an ill-defined area of pneumonic consolidation in the lower lobe posteriorly, the upper part of the lobe and the upper lobes being hyperaemic and oedematous.

Heart.—The wall of the left ventricle showed cloudy swelling, and the cavity was dilated; valvular structures normal.

Abdomen.—Spleen enlarged, very hyperaemic, but fairly firm; kidneys hyperaemic; liver not enlarged, but on section some biliary staining and cloudy swelling. All over the cardiac end of the stomach the mucous membrane was hyperaemic, but