basilic vein. The serum reaction was severe. The uterus healed in about six weeks and the disease was apparently cured. She lived two years and died of an acute disease. I was assisted by Mr. Skene Keith and Dr. Enraght.

I did not repeat the experiment for twenty years. I have five more cases to report.

CASE II.

A man, aged 56, suffered in July, 1907, from profuse haematuria; it recurred in February, 1908, and there followed an attack of renal colic in June, 1908; the urine was loaded with triple phosphates only. The provisional diagnosis was a calculus.

There was no haemorrhage for a year. In June, 1909, haemorrhage returned. Exploration of the bladder was followed by profuse haemorrhage, accompanied by masses of a villous growth—non-malignant villous papilloma. X rays revealed nothing. Haemorrhages recurred in August, twice in October; once in January, 1910, twice in February, and once in March and April. Continuous x-ray treatment was without effect; we tried radium under Dr. Finzi's care (50 to 100 mg. with a filter of 0.5 mm. silver or platinum for $1\frac{1}{2}$ to 4 hours). The patient had five treatments in one year—namely, in April, July, December, 1910, and January, March, 1911. At first there was less haemorrhage, but in March, 1911, a renal tumour on the left side was felt; it grew rapidly, and was removed by Dr. Thomson Walker in June, 1911. It was previously proved that the right kidney was normal.

After this operation the urine was clear for twenty-two months, when blood and villous tumour again appeared on two occasions. This must have come from the right kidney, which was previously sound. The whole case presented an interesting study, but the chief interest rests with the problem of secondary growths, which appeared six or seven months after the operation at the stitch points, and disappeared after the use of goat serum. These growths were treated by x rays in May and June, 1912, without effect. The left testicle and cord were also affected by a very large primary growth. The patient was in August, 1912, in a dying state, almost bedridden, and his weight 8 st. His normal weight was 13 st., and at the operation 9 st. 6 lb.

The Goat Serum Treatment—I injected $\frac{1}{2}$ oz. in the buttock on August 24th, 1912; $\frac{3}{4}$ oz. on August 28th, and 1 oz. on September 4th. The temperature was usually from 100° to 101° for twelve months before the first injection, rising and falling irregularly. After the serum it fell to normal, except during the forty-eight hours after each injection, when there was a rise, malaise, pains, and itchy erythema. On October 2nd I gave a fourth injection, a fifth on November 23rd, and a sixth on December 17th, 1912.

Result.—The goat serum cured the dyspepsia, toxæmia, and fever which had lasted a year. He now ate good meals, and strength improved so that in December he took drives. The secondary stitch growths got less in eight weeks and disappeared entirely by Christmas. The testicular growth disappeared, but a mass continued in the cord. The patient died in June, 1913. Mr. Shattock reported on the tumour, that microscopically it was a papilliferous or villous carcinoma. The long duration of the haematuria (four years) indicates the growth was possibly a papilloma which developed malignant characters (Cat. Path. Section, Roy. Coll. Surg.). It was after the course of radium that the simple character of the papilloma apparently changed and the tumour grew.

Mr. D'Arcy Power, being interested in the experiments, kindly placed two cases at my disposal at St. Bartholomew's Hospital.

CASE III.

A married woman, aged 35, seen on December 31st, 1912, had inoperable carcinoma of rectum. In January, 1913, I began to treat her with weekly injections ($\frac{1}{2}$ oz.) of goat serum, and at the same time injected 3 grains of arsacetin for Graves's disease. In June she got a chill, after sixteen injections. The motions were larger and passed easier; the pain was completely relieved. Dr. Elmslie Crabb of Brockley said the growth was certainly no larger. After this she had severe jaundice, and treatment ceased. The growth rapidly increased, rising in July up to the umbilicus, necessitating colotomy. She died in September, 1913.

CASE IV.

A man, aged 58, in February, 1913, presented carcinoma near the pylorus with secondary infection of glands and mesentery as proved by exploratory operation. I gave five injections similar to those given in Case III. Dr. Carruthers Corfield, Upper Tooting, informed me that the patient's appetite and health much improved and pain ceased. He died February, 1914. It was considered that life was decidedly prolonged.

CASE V.

A man, aged 72, seen in December, 1912, had the left iliac fossa filled with a large growth diagnosed as sarcoma. There was great oedema and discoloration of the left leg threatening ulceration, and anaesthesia below the knee. Treatment carried out by Dr. Image—weekly intramuscular injections of $\frac{3}{4}$ oz. of goat serum. After four injections Dr. Image wrote, "Left leg decidedly smaller," and, after fifteen injections, "An unaccountable improvement." The leg was almost normal, and the growth two-thirds the size. The patient, previously in great pain, had had opiates daily and opium poultices; now all pain had gone, and no opium was used. Dr. Image died in April,

1913, and treatment was discontinued for a time. The patient got worse, and in June, when Dr. Stork resumed treatment, the growth had increased, pain returned, and he died in August, 1913.

CASE VI.

Dr. Stork, impressed with the serum treatment, tried it on a male, aged 32, with inoperable epithelioma of the jaw and tonsils. On July 31st, 1913, the patient told me that radium did him no good, and that the serum was the only thing which took away the pain. Dr. Stork first saw him in January, 1913; he began the serum in June, and continued it weekly for three months. The patient died in November. This growth was very rapid in its course.

I suggest that the goat serum relieves pain by attacking the outskirts of the advancing growths, retarding or preventing their advance into normal and sensitive tissues. A sufficiency of the same chemical action ought to lead to shrivelling up of the tumour, and did so in some instances.

The cases with which the physician has to deal are far advanced, and often hardly cases for any treatment at all, or yet for conclusions. At the same time, a great deal may be done for some of these cases, and a wide field of research opened on scientific lines.

REFERENCE.

¹ *Proc. Roy. Soc. Med.*, April, 1912, vol. v (Therapeutical and Pharmaceutical Section), pp. 152-51; Seventeenth International Congress of Medicine, London, 1913 (Section of Therapeutics).

A CASE OF TETANUS: RECOVERY.

BY

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In the following case the long period of incubation—fourteen days—suggested a favourable prognosis in spite of the severity of the symptoms.

A Belgian soldier, aged 21, was wounded near Ostend on October 18th, 1914, by a rifle bullet, which passed through the upper third of his left thigh. He was brought to the Bevan Hospital, Sandgate (V.A.D., Kent, 30-36, T.F.A.), on October 26th, when I found an exceedingly foul wound discharging pus from entry and exit openings. The wound was irrigated twice daily with hot strong solution of iodine and also with hydrogen peroxide lotion, and hot boracic fomentations were applied every four hours.

He did well until 3.30 p.m. on November 1st, when he complained of sore throat and stiffness of the jaws. When I saw him at 5.30 p.m. signs of tetanus were marked; 1,500 U.S.A. units of antitetanic serum were at once injected subcutaneously close to the wounds. The wounds were packed full of potassium permanganate crystals, which, after three minutes, were washed out with 1 in 40 carbolic; hot boracic fomentations were ordered every four hours, and by the mouth calomel gr. $\frac{1}{2}$ and sod. bicarb. gr. 2 $\frac{1}{2}$ every hour till the bowels acted. The powders were continued for twelve hours, but as the bowels had only acted once slightly a turpentine and soap enema was given and followed by relief. The spasms in the back and abdomen had been very severe, and he had bitten his tongue; there were marked risus sardonicus and profuse cold sweats. He could only swallow when helped into the sitting posture and pressure applied to the left trapezius muscle. He was fed by tube through a gap in the teeth every hour.

On November 3rd he was very restless and the spasms and trismus were severe; there was great difficulty in breathing. The wound was irrigated with saturated solution of potassium permanganate. Hyoscine gr. $\frac{1}{150}$ was injected at 6.30 p.m., but gave no relief, and as the spasms were increasing morphine sulphate gr. $\frac{1}{4}$ was given at 11 p.m. and repeated at 11 a.m. next morning. At 3 p.m. he had a very severe spasm and seemed to collapse; he was deeply cyanosed and respiration ceased. Brandy was injected into the chest and hyoscine gr. $\frac{1}{150}$ into the arm; he rallied slowly.

From November 5th to 8th the spasms, trismus, and sweats were well marked. The calomel powders were repeated on November 3rd and 4th. On November 9th he became very restless, and was with difficulty kept in bed; the temperature rose to 102.8° F., and he had a hard dry cough. Veronal (gr. viii) was given at noon without result; at 6 p.m. he was given a rectal injection of potassium and ammonium bromides aa gr. x, chloral hydrate gr. xv. He had a restless night, and at noon on November 10th chlorotone gr. xxv was given by the rectum. At 8 p.m. he was given veronal gr. viii, but had very little sleep. On the following day the spasms were less, but on November 12th he was very excited, jerking about, especially when lying; he was given a mixture containing potassium, sodium and ammonium bromides gr. xlviii of each, one-twelfth part every four hours. He improved, and on November 14th the jaws began to relax; next day he could protrude his tongue. After this he made a rapid recovery.

The marked dyspnoea, a very grave symptom, was no doubt due to spasm of the respiratory muscles set up by

the tetanus toxin, and also, I think, increased by the injections of morphine sulphate, which may cause spasm of the pulmonary arterioles. I should certainly never use it again. Dr. Doyen of Paris recently reported 24 cases seen by him in France in which, after subarachnoid injections of serum, the patients were made to lie on their faces with the foot of the bed raised to cause the serum to gravitate to the brain; after adopting this manoeuvre he had 80 per cent. of recoveries whereas previously he had lost 80 per cent. I consider, however, that had this been done in our case the patient would have died, as he was quite unable to swallow excepting in the sitting posture. Intravenous subarachnoid or intracranial injections of serum were not used, as the man did well with subcutaneous injections for the first three days and intramuscular injections subsequently. The large doses of calomel and soda given the first day and the subsequent frequent doses helped greatly to eliminate the toxin and prevent any symptoms from the serum. The excitability on November 9th and 12th, when the spasms were diminishing, is worth noting, as it did not readily yield to treatment. I had, unfortunately, missed reading Dr. W. Sheaf's notes on the treatment of tetanus by chloretone, 30 to 40 grains in olive oil per rectum, in the BRITISH MEDICAL JOURNAL of October 17th, 1914; the dose of chloretone averaged 80 grains a day for five days. My thanks are due to Colonel Wilson, R.A.M.C. P.M.O. Shorncliffe, who kindly supplied the serum; to Dr. Bradbury of Sandgate, who saw the patient with me on several occasions, and also to the excellent nurses he had.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

AN ARITHMETICAL HELP TOWARDS X-RAY LOCALIZATION.

THE following method, which I have worked out in order to simplify the determination of the exact depth of a foreign body from the surface, may be expressed in the form of an arithmetical rule.

"Multiply the distance from the anticathode to the screen by the amount of the excursion of the shadow on the screen, and divide the product by the sum of the amount of displacement of the tube and the amount of the excursion of the shadow."

This can be easily remembered by the formula

$$\frac{A \times S}{T + S}$$

where A is the distance from the accurately centred anticathode to the screen above, S is the amount of displacement of the shadow, and T is the amount of displacement of the tube.

It is necessary that T and S should be expressed in the same terms—either in inches or centimetres, but A may be expressed either in inches or centimetres, and the result will be in the same terms as A. The screen is supposed to be on the skin surface. The three following examples will show the simplicity and rapidity of the calculation required.

1. A. Distance of anticathode from screen = 22 inches.

T. Displacement of tube = 6 centimetres.

S. Excursion of shadow = 2 centimetres.

By the formula $\frac{22 \times 2}{6 + 2} = \frac{44}{8} = 5\frac{1}{2}$ inches distance of foreign body from surface.

2. A. Distance of anticathode from screen = 54 centimetres.

T. Displacement of tube = 3 inches.

S. Excursion of shadow = 1 inch.

Then $\frac{54 \times 1}{3 + 1} = \frac{54}{4} = 13.5$ centimetres from the surface.

3. A. Distance of anticathode from screen = 20 inches.

T. Displacement of tube = $\frac{3}{4}$ inches.

S. Excursion of shadow = $\frac{1}{4}$ inch.

Then $\frac{20 \times \frac{1}{4}}{\frac{3}{4} + \frac{1}{4}} = \frac{5}{1} = 5$ inches from the surface.

By the employment of this method the necessity for the use of triangulation charts or apparatus with sliding-scale pieces is done away with. Providing the tube is accurately centred and the measurements of A, T, and S

are exact, the depth of the foreign body is given with mathematical accuracy.

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CASE OF LARYNGEAL SARCOMA.

A MAN aged 75 was sent to me by Dr. Cowie of Bourne-mouth on account of laryngeal trouble of eighteen months' duration. His voice was little more than a whisper, and he complained of difficulty in breathing, cough, and expectoration.

On examining the larynx it was observed that the left cord was normal and moved freely, but from the level of the right aryepiglottic fold downwards a reddish papillary mass occupied the right side of the larynx. Opposite the sound left cord the growth presented a whitish area covered with close-set, short, pointed papillae. No secondary glandular deposit could be found.

A diagnosis of epithelioma was made from the clinical evidence. A subsequent report after the microscopic examination of the growth stated it to be "a large round-celled sarcoma."

The patient at first declined operation, but subsequently agreed to have thyrotomy performed. He objected to any procedure which would deprive him of his voice.

Operation was performed on March 4th under chloroform. After a preliminary tracheotomy the anaesthetic was given through the tube for the remaining steps of the operation. The thyroid cartilage, which was ossified, was sawn through. On separating its wings, the growth was seen to be much more extensive than appeared in the laryngeal mirror. It almost filled the space from the level of the cords to the upper border of the cricoid. It was difficult to see how the patient had breathed at all. After cocaineizing the larynx, the growth was peeled off the thyroid up to an incision just beyond its limits.

As there was considerable bleeding and the patient had some bronchial catarrh, I decided to retain the tracheotomy tube for a day or two. He was nursed in a well-ventilated room with open windows. There was a very free discharge of bloodstained mucus from the tube for the first two days. On the third day the tube was removed. The wound above the tracheotomy opening looked like giving some trouble, but cleared up under a boric fomentation. The first attempts to take liquid food caused some pain and troublesome cough, but this difficulty soon disappeared after the tube was removed.

The patient made an uneventful recovery. Six weeks after operation laryngoscopic examination showed that the area occupied by the growth was completely healed over. The patient feels well and strong, and has a rough but useful voice. Now (six months after operation) there is no evidence of recurrence, and the patient is in excellent health. A slight fold is to be seen replacing the right cord.

In view of the extent of the disease and the nature of the operation permitted, one could hardly anticipate a permanently successful result, but the patient has at all events enjoyed six months' excellent health.

Sarcoma of the larynx is a somewhat rare condition, and for this reason I have thought it worth while to put this case on record.

Bournemouth.

CHARLES SALKELD, M.B., B.S. Durh.

Reports of Societies.

SOCIETY OF MEDICAL OFFICERS OF HEALTH.

At a meeting on January 8th Dr. W. WHITLEY read a paper on *Criminal abortion and abortifacients*, in which he laid stress on the importance of distinguishing between those abortions which were successful and those which were not. In the former case life was utterly destroyed, and in the latter the infant, when born, might be puny, undeveloped, and devoid of resistive power. If it should survive, it might be only to establish a pathological existence, and possibly to perpetuate a race of degenerates. Among the means adopted to produce abortion the commonest in England was by repeated, regular, and