the state of rest the pause will again appear, though perhaps less marked, and there will be for a time a considerable increase in the pulmonary ventilation beyond the normal in repose. This is clearly seen in the second chart on page 8 recording the experiment.

If anybody should be still disposed to question my contention that the increased muscular work in these experiments is due to the influence of volition, the experiment of Mosso showing that fatigue of "volition" suffices to arrest muscular contraction would go far to dispel any doubt in that respect. The following experiment, which I have not seen quoted, confirms remarkably Mosso's discovery, while at the same time it is a strong argument in favour of the view advocated in this lecture, and differentiates very clearly the motor centres of the brain.

Let a person, while sitting in an arm chair, raise a weight as in the experiments related above until his arm is too tired to continue the work. He then takes a rest in mind and body of say one minute, and again resumes lifting the weight as long as he can. The number of times the weight is lifted is counted in both cases. Next a rest is taken perhaps for ten minutes, and the same kind of exercise repeated until the arm is exhausted; at the expiration of that time the arm is placed in a state of repose, but the "will" continues being applied as strongly as possible towards the exertion of lifting the weight, and this is continued for one minute. At the end of that minute the weight is again raised with that same arm, when it is found to be so tired that it is not equal to raising the weight by perhaps more than about one-half the number of times the weight was lifted under precisely similar circumstances without the application of the will.

If, however, during the interval of one minute between the liftings, the will be directed towards a different kind of muscular work, such as running uphill, on resuming the lifting, the arm is found to be fresh and rested, and can raise the weight the same number of times as if the mind had been at perfect rest for that minute.

The following are two experiments which illustrate the phenomena:

While reclining in a deck chair, I raised a weight of 10 lbs. 49 times, and gave up from fatigue; after resting for one minute the same weight was lifted to the same height 40 times; a long rest was now taken and the weight lifted 47 times, when the work was stopped by fatigue; then the arm was rested while applying volition as strongly as possible to a continuation of the same effort of lifting for a lapse of one minute. Lifting was now resumed, when the weight felt very heavy and could only be raised 21 times—clearly not because of the fatigue of the muscles as they were rested, but from the exhaustion of the power of volition. A similar experiment on my assistant gave the following results:

Normal liftings, 42; after one minute's mental and physical rest, 41 liftings; after a prolonged rest, 44 liftings: after one minute's physical rest, but with volition exerted towards a continuation of the same exercise, 31 liftings.

The same experiment was repeated by both of us without applying the will towards the continuation of the same exercise, but towards an exercise quite different, such as running, thereby resting the motor centre on which volition had exerted its action towards lifting the weight. After a minute the arm felt perfectly rested and raised the weight the same number of times to the same height as before.

ARTHUR DURHAM MEMORIAL.—The friends, and they are many, of the late Mr. A. E. Durham, have resolved to perpetuate his memory by the endowment of two beds at Guy's Hospital, one in each of his old wards, Lazarus and Martha, to be called the Arthur Durham beds. For this purpose a sum of £2,000 is requisite. Contributions may be paid to Mr. C. H. Wells, at the office of the Medical School, Guy's Hospital; and they will be acknowledged from time to time in the *Guy's Hospital Gazette*. All subscribers of one guinea and upwards will receive a platinotype enlargement of a life-like photograph of Mr. Durham. The circular asking for funds was posted on June 11th, and in ten days the sum of £653 was collected, being almost one-third of the entire amount that is required.

SELECTIONS FROM MY CASEBOOKS.

By ALFRED SHEEN, M.D.,
Senior Surgeon Cardiff Infirmary.

I.

I.—IMPACTED FRACTURE OF THE NECK OF THE FEMUR IN A VERY OLD MAN.

J. H., aged 91, a hawker, was admitted into Cardiff Union Hospital on January 17th, 1893. He had been a heavy drinker all his days, and had suffered from bronchitis for some years.

On admission he stated that he had been knocked down by a cab a few hours before, but was not run over. He could not get up without help, and complained of pain about the left hip, loss of power in the left leg, and great pain on the least movement of the limb. The left foot was everted, the limb lay flat on the bed, and was nearly 2 inches shorter than the right. No definite crepitus was obtained, but great pain was caused by manipulation, and there was thickening about the trochanter.

The limb was steadied by means of extension with pulley and weight, and a large sandbag on each side of thigh. After a few days he was allowed to sit up in bed, and six weeks later was allowed to get up on crutches, and he continued to get about until his death in April, 1894, from acute nephritis. The accompanying reproduction of a photograph of the upper

part of the femur will give a good idea of the displacement and the amount of repair.

II.—LEFT SUBCLAVIAN ANEURYSM CURED BY LARGE DOSES OF IODIDE OF POTASSIUM AND REST IN BED.

R. D., aged 36, single, a lampman, was admitted to Cardiff Infirmary on March 21st, 1893, with a history of an illness beginning suddenly four years earlier whilst under treatment for a wound of the leg. The knees swelled, and he had pains in most of his joints and limbs, attributed to rheumatism. The patient had had these pains off and on ever since. The left arm had for some years been getting weaker. Six months before admission, when rubbing oils in, the patient discovered a swelling under the left clavicle, but did not seek advice till a month before admission. There was an obscure specific history. He was a fairly healthy man of good physique; just below the left clavicle was a smooth pulsatile swelling, the borders of which were not determinable. Pulsation ceased

on compressing the subclavian artery. On extending the arm from the side the swelling was distinctly felt in the axilla, and it extended up to and just above the clavicle. The fingers of the left hand were clubbed; the radial pulses were synchronous and equal in volume. The heart was normal but a *bruit* was heard over the tumour, which was the size of a goose's egg.

On April 2nd he was put on iodide of potassium (gr. x) thrice a day. The dose was gradually increased to 3j thrice a day. On April 30th and on May 14th he was put on 3jss thrice a day. This he took with slight intermissions, on account of diarrhoea, till the end of September. On July 23rd it was noted that there had been "no pulsation for at least five weeks." On August 21st he was made an out-patient. He was shown before the Cardiff Medical Society in October, 1894, when there was no evidence of the aneurysm, though the radial pulse was slightly weaker than on the other side. He was able to do his work.

Dr. Waldo, of Clifton, reports a somewhat similar case under his care in the Bristol Royal Infirmary, in 1881,¹ in a farm labourer, aged 40. In his case the treatment was "perfect rest in bed, bandaging the arm to the side, low diet, restricted allowance of fluids, and iodide of potassium." gradually increased from 10 gr. to 50 gr. thrice a day. The man left the infirmary four months after his admission, returned to his work, and was quite well one year afterwards. It is not stated whether there was any specific history in this case.

III.—CYSTIC THYROID: EXCISION: DEATH.

E. C., aged 24, single, a collier, was admitted to the Cardiff Infirmary on May 15th, 1894, with a history of a swelling on the left side of his neck, first noticed when he was 15 years old. It had slowly increased in size up to the present time. This illustration gives a good idea of his appearance on

admission. The patient was pale, rather anæmic; the respiration was noisy, except when the patient was quite still. After movement, exertion, or speaking there was marked stridor.

On June 9th chloroform was given and I removed the left half of the thyroid by a long oblique incision. The dissection was carried down to the wall of the largest cyst, and after that dissecting forceps were used almost exclusively for separating the tumour from its surroundings. Veins were

taken up and tied at frequent intervals; they were numerous and some of considerable size. The whole of the left half of the thyroid was converted into cysts of various sizes, and the part adjacent to the isthmus was of almost calcareous hardness. The dissection occupied about three-quarters of an hour. The patient breathed badly if deeply anæsthetised and whenever the tumour was at all drawn outwards. The operation took a little over an hour, and all antiseptic precautions were observed.

The wound was irrigated with perchloride of mercury solution, 1 in 4,000; interrupted silkworm gut sutures were used, a drainage tube inserted at the lower end, the whole dressed with iodoform, green protective, sublimate gauze and wool and bandage. The dressings were removed in the evening.

On June 10th he was restless, and complained of pain in the abdomen. The wound was dressed.

On June 11th he had a cough, and expectorated some mucopus. The face was pale. He slept with the mouth open. The tongue was coated, dry, and brownish. There was rapid running pulse; the temperature was 100° F. Crepitation was heard at the bases of both lungs, but was more marked on the right side. The wound was dressed and the tube removed. The wound was dry; there was no discharge, redness, or swelling. The temperature in the evening was 104°. Stimulants, ammonia, and strychnine were given. The patient was unable to cough up sputum.

On June 12th the face was dusky, the skin clammy, and the nares working. He was very restless, throwing his arms about. Stridor was marked. He died at 10 P.M.

Necropsy.—The wound was healed. The region operated upon was dissected, and everything found perfectly healthy. The sympathetic, the phrenic nerve, and the pneumogastric and its laryngeal branches were quite sound. The trachea, compressed laterally, had not resumed its normal shape. There was great congestion of the lungs, some oedema, and commencing hepatisation of both bases, the right lung more affected than the left.

IV.—PEDUNCULATED SEBACEOUS TUMOURS OF THE SCROTUM.

J. M., aged 23, married, a collier, was admitted to Cardiff Infirmary, August 16th, 1893. Four years ago he had first noticed small hanging tumours in scrotum. Several similar

growths appeared soon after, and increased slowly but steadily in size. On August 28th these tumours were removed under the usual antiseptic precautions. There were three sub-

¹ Bristol Med. Chir. Journal.

sequent dressings, and the patient was discharged cured on September 13th.

V.—HYPERTROPHY OF LEFT BREAST.

A. C., aged 31, single, a housekeeper, was admitted to Cardiff Infirmary on April 24th, 1888, with enlargement of the left breast, as shown in the accompanying illustration.

It had taken between eight and nine years to grow to the size shown. The breast was generally enlarged, the nipple was normal and freely movable. The skin over the gland was normal and freely movable. The vertical measurement over the tumour was $13\frac{1}{2}$ inches, and the horizontal $17\frac{1}{2}$ inches. The base measured $27\frac{1}{2}$ inches in circumference. There was no pain.

On April 25th, under ether, I removed the breast by an elliptical incision under strict antiseptic precautions. The hæmorrhage was comparatively slight and chiefly venous. The breast weighed 7lb. 1 oz. On April 28th the temperature went up to 102° F. The patient was up for a few hours on May 1st, when all fourteen sutures were removed, and nearly the whole line of incision healed. The patient was discharged well on May 23rd.

VI.—SO CALLED PERFORATING TUMOUR OF THE DURA MATER.

V. M., aged 4 years 9 months, was seen on December 2nd, 1890. Two months earlier, when the child rose one morning, the right ear was seen to be projecting, and on examination a swelling about the size of a hazel nut was seen behind it, smooth, uniformly hard, not painful, and the skin over it was unchanged in colour. The swelling gradually enlarged in all directions. A fortnight later a doctor saw it, said it was a "gathering," and ordered linseed poultice, which treatment was continued for four weeks. It was lanced a week ago, but only blood came out.

When the child came under treatment there was a soft, semi-fluctuating swelling, measuring $5\frac{1}{2}$ inches horizontally and $4\frac{1}{2}$ vertically; and there was right facial paralysis. There was marked optic neuritis on the right side, and commencing neuritis on the left side.

The child lingered on, losing much flesh, and the tumour increasing to such an enormous size as to resemble a second head. She died after several weeks.

Necropsy.—(Notes by Dr. D. R. Paterson). Surface of tumour ulcerated and discharging at several points. Seat of

external ear could not be made out. The mass extended into the neck and the glands; these were enlarged. On removing the skull cap a flattened mass of tumour was seen, exerting considerable pressure on the parts about the lower end of the Sylvian fissure and fissure of Rolando. More posteriorly an offshoot of the tumour had penetrated into the

temporo-sphenoidal lobe, and there expanded into a pear-shaped mass. Many parts of the petrous bone retained their consistence of form; they were not absorbed entirely by the tumour mass; only at certain points were ingrowths sent into the brain. The whole tumour was soft and almost brain-like in consistence.

VII.—ANOTHER CASE IN AN OLD MAN.

T. H., aged 75, hawker, was first seen on March 1st, 1890, complaining of nothing definite but suffering from general weakness. He had had a "stroke" eighteen months before on the right side, but recovered; no trace of such an attack was left. On the left side of the head, in front of the parietal region, was a soft, immovable swelling, the size of a hen's egg, which gradually increased to the size of a large orange. It never troubled him, and there was no pain. He was a feeble old man, and seemed to sink gradually, dying on October 19th, 1890. A slight cough troubled him. He was conscious to the last.

Necropsy.—(Notes by Dr. D. R. Paterson). On reflecting scalp, the tumour was found to be soft and friable, involving the bone of the skull, which was entirely absorbed, the hard edges of the bone being felt at the margin of the tumour. On removing the skull cap the tumour was found to go through the skull, forming in all a mass about the size of a large orange. It affected chiefly the upper part of the left parietal bone, the adjoining part of the left frontal bone being likewise involved, and extended over the middle line on the vertex. The tumour exerted considerable pressure on the brain, flattening to a large extent the convolutions of the frontal and parietal lobes on the left side. There were no adhesions between the dura mater and the brain. On section the tumour was soft, and had a marbled appearance; scraping of juice showed small, round, and spindle cells under the microscope. On the seventh left rib, in front of the angle, was a small tumour about the size of a walnut, growing from the rib, which was almost absorbed at this point. Microscopically it was similar to the one on the skull.

VIII.—CASE OF FIBRO-ADENOMA OF BREAST.

Miss E., aged 30, was first seen in March, 1892. She was suffering from a hard, irregular, freely movable tumour, the size of a goose's egg, in the upper half of the right breast. It had been first noticed in June, 1891, when it was the size of a small nut. I advised removal, which was declined. I

saw her again in September, when slight increase in the size of the tumour was to be noted. She had been trying Count Mattei's remedies, without any effect, of course. In September, 1894, she came to me again expressing a wish for an operation. She had been for nine months under a quack living near Birmingham, who had undertaken to cure her without operation, and had, she said, "nearly killed her."

On September 18th, under chloroform, with all antiseptic precautions, I performed what is called Thomas's operation, by making an incision along the curved groove below the breast, and shelling out the tumour. The drainage tube was removed on September 20th, and the stitches of silkworm gut on September 25th. There were three dressings, and the patient was up on September 30th. The temperature was normal throughout, except on the evening of the tenth day,

when it went up to 100° F. The illustration shows the appearance of the breast on October 6th.

IX.—CASE OF ALOPECIA AREATA.

H. R., aged 35, a builder, was seen on June 13th, 1892. There were several bald patches at the back of the head, which had come on during the previous nine months. He was ordered an ointment of the yellow oxide of mercury (gr. iv to an ounce of vaseline), which he continued to use till the middle of September. The hair commenced to grow again, being at first quite white and very fine. When seen in November, 1894, the hair was black, and there was no remnant of the disease left.

I am indebted to Dr. Morland, House-Surgeon Cardiff Infirmary, and Dr. J. D. Williams, Resident Medical Officer, Cardiff Union Hospital, for assistance in preparing some of these notes.

TREATMENT OF FUNCTIONAL CURVATURES OF THE SPINE BY GYMNASTICS.

By CHARLES ROBERTS, F.R.C.S.

OUR sympathy with Mr. Christopher Heath's efforts to rescue the treatment of lateral curvatures of the spine from the instrumentalists must not be allowed to lead us into the opposite fault of putting too great trust in the gymnasts. A knowledge of the various forms of gymnastics and considerable discrimination in their application is essential. There is no pathological relation between angular curvature due to caries of the vertebrae and its constitutional effects and the functional accommodation of the elastic spinal column to faulty positions and habits of the body, to unequal length of the lower limbs, or to imperfect or irregular action of a few or many of the spinal groups of muscles. The one should be called organic curvature, or, indeed, organic disease, while the others should be called functional curvatures of the spine. If we once get the functional nature of lateral curvatures impressed on our minds, we shall see the uselessness of the instrumental and the recumbent treatment necessary in

organic disease, and we shall set about removing the causes and assisting Nature to restore the spinal column to its normal condition.

Functional curvatures of the spine are—in relation to the conditions which accompany them—healthy and normal. If one leg is shorter than the other there must be a curvature of the spine to a corresponding degree to keep the body erect. This is a cause, but not in my experience so common a cause as Mr. Heath has found it. The spine in young girls is very flexible, and placing a book under one foot will obliterate some lateral curvatures which are not due to unequal length of the two legs. Unless there is a measurable difference between the two legs the curvatures due to this cause need not be meddled with, and when the difference of the two legs is considerable all that is necessary is to alter the soles and heels of the shoes. Without the adjustment of the length of the legs, gymnastics will be injurious as tending to confirm a functional curvature of the spine on an unequal base. Gymnastics are not a remedy for this form of curvature, they serve only to improve the general health.

Next we have a series of curvatures caused by faulty positions in school owing to the left hand and arm being employed to support the body, and the right arm left free to write, draw, hold books, etc. Of the same kind are the curvatures produced by playing active games in which the right hand, arm, and leg are chiefly used. In this class of cases we have a functional accommodation of the spine to balance the body, and in addition, an unequal development of the muscles of the two sides of the body, those of the right side being stronger than those of the left. These are the most troublesome forms of spinal curvature, as correcting the position of the body does not correct the curvature of the spine, the faulty curves being fixed and retained by the unequally balanced muscles. At first sight there does not appear to be any reason why girls should be more liable to spinal curvatures than boys; but girls are excessively right handed, much more so than boys, and this has much to do with initiating, if not actually causing, lateral curvature in girls. It is just because there is this disproportionate muscular development of the lateral halves of the body that gymnastics have to be employed with great caution.

To hand over these cases to the ordinary teacher of gymnastics is not to cure them but to make them worse, because the muscles on the stronger side, being better nourished, grow stronger more rapidly than those on the weaker side. In prescribing physical exercises for this class of cases the immediate needs of the weaker half of the body must be provided for, together with the avoidance of the faulty positions, until the curvatures have been corrected, when general gymnastic exercises may be adopted. Cases of this kind sometimes recover by the use of instruments or the recumbent position, because the faulty positions are forcibly corrected, and muscular action is restrained until both sides of the body become equally impoverished, and a fresh start is made on equal grounds. With proper supervision this class of cases is best treated by gymnastics of the simpler sort with dumb-bells and the like, and not by the trapeze and ropes above the ground. The so-called Swedish system has no advantages over the ordinary methods, and it is slower in its results.

The chief indications for the treatment by gymnastics of the lateral and the cervical angular curvature causing round shoulders are to equalise the muscular development of the two lateral halves of the body, and to favour the freest possible mobility of the vertebra in all directions on each other, and trust to a good carriage of body (due to a good all-round muscular development) to secure the true erect position of the spinal column. In cases of functional angular curvature, lying in the prone position with the arms tucked under the chest favours its correction, but little is gained by adopting the supine position in any functional form of curvature except as avoiding unfavourable positions of body.

A very large number—probably the majority of the cases of functional spinal curvature—are hysterical, and are mere imitations of conditions which the patient has seen, or heard described, or read about. I have seen growing-out shoulders and spinal curvatures in cases of chorea maintained throughout the disease, and disappear only with the choreic symptoms, notwithstanding the lack of muscular control by such