and heat, it may be left for a week or two until time and opportunity be found to finish it off.

This finishing-off process requires a little practice, but is not difficult. The slide on which the section is to be mounted is placed on three or four pieces of cork over a water bath until it is warmed through. This is to prevent the too rapid setting of the jelly. It is then transferred to the tripod, and a quantity of jelly is poured on to the centre and gradually on to the end nearer the manipulator; the cover glass is then taken and gently lowered, the near end first and so gradually down on to the slide. The jelly on the cover keeps the section in position sufficiently long to allow of the cover glass coming into its place. The slide usually retains sufficient heat to melt away all superfluous jelly. Should this not be the case, the whole slide may be again heated over the water bath, and by the application of gentle pressure the extra mounting medium is squeezed out. If this extra medium be left at the margin of the cover, the slide may be left for some time without further treatment. To preserve the section remove the extra jelly with a spatula, wipe carefully with a moist cloth and then with a dry one. After this the margin of the cover glass and the slide should be carefully painted over with benzole balsam, layer after layer being applied at intervals of two or three days, until there is a good firm coating. Unless this be done at once after clearing off the extra jelly, the jelly at the margin under the cover dries rapidly, air bubbles make their way in, and once there, will eventually spoil the section. At one time I afterwards pasted first a layer of calico and then a strip of black glazed paper over the edges of the slide. I have found, however, that it is better to mount them in common wooden frames like slate frames, so that the cement may be examined from time to time, and if necessary repaired. The sections are now ready for examination.

List of specimens exhibited by means of limelight lantern with 9-inch condenser, kindly lent by Dr. Alexander Bruce, of Edinburgh: Specimens of normal lung (1) uninjected, and (2) injected with carmine gelatine; (3) sections of emphysematous lung uninjected; and (4) injected with Prussian blue to show the normal structure and arrangement of the blood vessels, alveoli, and air passages, and the altered conditions in emphysema.

5. Lung of child in which lower part of upper lobe had been invaded by tubercle. The gland at the root apparently corresponding to this area is much enlarged, and evidently caseous; radiating from this to the surface are masses of tubercle, some small and not caseous, others larger, apparently formed of several smaller nodules fused and now become caseous. Here septa are slightly thickened, and the tubercle nodules are apparently commencing in the small lymphatic nodes.

6. Tubercular catarrhal pneumonia in the lung of a child. The lobular distribution is very distinctly marked, small areas of healthy tissue appearing here and there. Away from the large consolidated patches are small tubercle nodules, evidently growing in the inter-alveolar or small interlobular septa. Here also the glands are enlarged, caseous, and tubercular.

7 and 8. Other sections in which the patches of catarrhal pneumonic consolidation are not quite so typical, and in which there is more marked interstitial tubercle.

9. Miliary tuberculosis in child. Section injected with Prussian blue and stained with picro-carmine. In this the tuberculosis appears to have spread by the lymphatics, but catarrhal changes have quickly supervened. An examination points, however, to the fact that the tubercle is primarily strictly confined to the interlobular septa. The glands at the root are enlarged and caseous. The non-vascular condition of the tubercle nodules is well seen in this specimen.

10. Section of acute miliary tuberculosis. Here the nodules are very small, and are quite distinct in appearance from anything we have yet seen. They are found commencing in the interlobular septa, and have evidently arisen in connection with infection by the lymph channels or blood vessels. Around some of these points catarrhal changes may be observed, but they are comparatively little marked. The patches are very different from those that are due to infection by the air passages.

11. Lung with well marked catarrhal pneumonia in lower lobe. In the upper lobe is a large gangrenous cavity, opening directly into the large bronchus. In the walls of this cavity we have a slight development of granulation tissue in which is a considerable quantity of altered blood pigment.

12. Section of lung from a case of chronic fibroid phthisis with emphysema. At the apex are small cavities filled with partly caseous, partly calcareous, material. The walls are composed of

deeply pigmented fibrous tissue, which, by its contraction, has caused a puckering of the thickened pleura at the surface. The pleura is thickened over the whole lung, and the two lobes are firmly bound together. A few firm fibroid nodules are to be seen scattered throughout both lobes.

13. Typical case of phthisis. Chronic fibroid phthisis at the apex; thickened pleura and septa. Small cavities with fibroid, deeply pigmented walls, little normal tissue left; base consolidated, catarrhal and caseating pneumonia well marked; a few masses of racemose tubercle throughout the lobe. There is evidently considerable congestion in the lower portion of the lung.

14, 15, and 16. Similar specimens from other cases.

17. Stonemasons' phthisis. Lung much consolidated; pleura enormously thickened; lobes adherent; several cavities with thickened fibrous and pigmented walls; nodules of chronic fibroid thickening, firm at the margin, frequently deeply pigmented, and in some cases caseating in the centre; septa thickened. The glands at the root are enlarged, dense, and fibrous; medullary portion deeply pigmented; cortex free from pigment.

18. Section of coal miner's lung with thickened pleura. Small, deeply pigmented, fibrous nodules, paler in the centre, darker at the periphery; no cavities. The distribution of the pigment in the deep layer of the pleura, the interlobular septa, and the lymphatics around the vessels and bronchi is here well seen.

Other specimens of pulmonary infarction, tubercle of the liver (acute miliary in the tissue of the portal spaces, and caseating tubercle affecting the bile ducts), waxy sago spleen, showing localisation of the disease in the Malpighian bodies, old infarction of the spleen, in which a fibrous and contracting capsule around the caseating or softening central mass is well seen; waxy kidney (large and small forms), granular contracted kidney, waxy liver, cancer of the lung, etc., were exhibited.

A METHOD OF EXAMINING AND REMOVING THE SPINAL CORD FROM THE FRONT.

By THOMAS HARRIS, M.D.LOND., M.R.C.P.,

Pathological Registrar to the Manchester Royal Infirmary; Assistant Lecturer and Demonstrator of Pathology in the Owens College; and Assistant Physician to the Manchester Hospital for Consumption and Diseases of the Throat.

THE method of examining and removing the spinal cord which is adopted in the majority of the pathological departments of the hospitals of the United Kingdom is by means of a median incision along the posterior aspect of the body, the laminae of the vertebrae from the cervical to the lumbar region being subsequently removed with the aid of a saw, or of a saw assisted afterwards by a strong pair of bone forceps. In the majority also of the German universities a similar method is employed. However, as far back as 1863, Professor Brunetti, of Padua, published¹ an account of a method which he had introduced for removing the cord from the anterior aspect of the body by means of specially constructed chisels, with the aid of which he removed the bodies of the vertebrae, and so exposed the interior of the vertebral canal. This method has been employed in the Pathological Institute at Vienna for the past fifteen or twenty years, and having heard very favourable accounts as to the advantages of the method, I took an opportunity last autumn of visiting Vienna, chiefly with the object of becoming practically acquainted with the details of the process. Since that time, I have adopted it in the *post-mortem* department of the Manchester Infirmary, and finding it most expeditious and in many ways convenient, a short account of the method may not be unacceptable to those who have many *post-mortem* examinations to make, and who have not yet tried it. A brief notice, by Dr. Cayley, of the method will also be found in Quain's *Dictionary of Medicine*.²

The organs in the neck, thorax, and abdomen are first examined, by means of the usual median incision from the chin to the symphysis pubis, and are all removed from the body, so that the anterior and lateral aspects of the bodies of the vertebrae are exposed along the whole length of the spine. After the exposed parts of the vertebrae have been examined, a wedge-shaped wooden block³ is placed under the body

¹ *Gazzetta Medica Italiana Provincie Venete*, Anno vi, Nos. 17, 18, 19, 20.

² *A Dictionary of Medicine*, edited by Richard Quain, M.D., F.R.S., 1st Edition, page 1020.

³ A convenient block for this purpose is one 12 inches long, 6 inches high, and 6 inches broad at the base.

in the lumbar region, so as to make that portion of the spine arch well forwards. By means of a strong knife the intervertebral cartilage between the fourth and fifth lumbar vertebrae and that between the fifth lumbar vertebra and the sacrum, are divided. For the subsequent procedure we require a moderately heavy wooden mallet, a strong pair of forceps (Fig. 3), and two chisels. The chisels are of peculiar shape, as will be understood from studying the accompanying illustrations (Figs. 1 and 2), it will, however, be unnecessary to enter into a detailed description of them. Each chisel is 14 inches long, and has a cutting edge $1\frac{1}{2}$ inch broad; adjoining the cutting edge is a small blunt projection $\frac{1}{2}$ inch long, which being introduced into the vertebral canal, acts as a guide. One chisel is used for dividing the pedicles of the vertebrae on one side of the body, the other for the pedicles on the opposite side. The only difference in the chisels is that

Fig. 1.—Chisel for dividing the pedicles on the left side of the spine. (Surface and side view.)

Fig. 2.—Chisel for dividing the pedicles on the right side of the spine. (Surface and side view.)

which is necessary for their employment on one or other side of the spine.

After the intervertebral cartilage above and that below the fifth lumbar vertebra have been divided, the intervening vertebral body is removed by chiselling through, with the aid of the chisels and mallet, the pedicles of that vertebra, one chisel (Fig. 2) being used for the right pedicle, the other (Fig. 1) for the left pedicle. After the pedicles have been divided, the body of the fifth lumbar vertebra is very easily removed by seizing it with the forceps (Fig. 3), and using a knife to free it from any surrounding soft structures.

The dura mater covering the corda equina is thus exposed for a short distance, and the whole of the vertebral canal may now be opened by chiselling through the pedicles of the vertebrae, or, where that is not readily accomplished, as in the dorsal region,

through the posterior part of the bodies of the vertebrae. It is, however, impossible to divide these parts from the lumbar to the upper cervical region, firstly all along one side and then all along the other: it is necessary to divide the pedicles of only four or five vertebrae on the right side with one chisel, and then the pedicles of the left side of the same vertebrae with the other chisel, after which the intervertebral cartilage above the body of the vertebrae (the pedicles of which were last cut through) is divided, and the bodies of the separated vertebrae being seized with the forceps are removed. The wedge-shaped block of wood is now moved a few inches higher, until it is placed beneath the vertebrae of the lower part of the dorsal region, so as to make those project well forwards. The pedicles of four or five more vertebrae are then divided by means of the chisels and mallet, and after the intervertebral cartilage above them has been divided, the bodies of those vertebrae are removed. Then the block is again moved upwards a few inches, and four or five more vertebral bodies removed in a similar manner, and so on until the base of the skull is reached. By this means the dura mater is exposed from the occipital foramen to the lowermost part of the lumbar region, and if the operation has been done carefully, both it and the enclosed cord are uninjured. In using the chisels it will be found necessary to keep the cutting edge nearly horizontal when working with them in the lumbar and dorsal regions, but in the cervical part it should be held obliquely or nearly vertically. Although not absolutely necessary, an assistant will be found very useful in seizing the vertebrae with the forceps and pulling them forwards away from the vertebral canal, when the operator is using either of the chisels.

Fig. 3.—Forceps for removing the bodies of the vertebrae after the pedicles have been divided.

After the vertebral canal has been exposed, the external aspect of the dura mater and its surrounding structures are examined. That membrane and the nerves of the corda equina are next divided at the lowermost part exposed, and, together with the spinal cord, removed by dissecting from below upwards from the vertebral canal. The dura mater is then laid open by means of scissors, and the spinal cord examined in the usual way.

There are several advantages in this method of removing the spinal cord. We avoid all necessity for an incision along the back; the only incision into the skin of the trunk is the usual median one along the anterior aspect of the body. The corpse is consequently not so much disfigured, and we avoid the labour of extra stitching. The method is more expeditious, and involves less labour when the operator has had a little experience of its details. This, however, is not the case at first. The majority of beginners will probably find it hard work, and I must confess that my first two or three attempts caused me some little disappointment, as I found the chiselling really hard labour. When, however, one has done the operation a few times, it is easily and quickly accomplished. That it is much more rapidly carried out than the method of opening the canal from the dorsal aspect is sufficiently testified to by the fact that it is the only method employed in the Pathological Institute of Vienna, where they have so many *post-mortem* examinations to make that an expeditious method is indispensable. In Vienna it is carried out by the *post-mortem* room porters, who accomplish the task in a wonderfully short time. By this method also we obtain a much better view of the spinal cord and spinal nerves, and can more readily localise any lesion in the cord, so as to state exactly the relation of the lesion to any particular part of the vertebral column.

As will be surmised, the removal of the bodies of the vertebrae renders the corpse very limp, much more so than when the spinal cord has been removed from the dorsal aspect. This, however, is but a very slight drawback to the method, since it requires but the exertion of a small amount of ingenuity to render the body

rigid by means of a broom-handle or piece of iron tubing. Even that, however, is unnecessary, as with care the body can be placed at once without difficulty into the coffin.

The method is one which I believe will be much more frequently employed in the United Kingdom when it becomes more fully known than is the case at present.

The chisels and forceps are now made by Messrs. Weiss and Sons, Oxford Street, London, to whom I am indebted for the accompanying illustrations.

A CASE OF HYSTERO-EPILEPSY OF TWENTY YEARS' DURATION, TREATED BY REMOVAL OF THE UTERINE APPENDAGES.¹

By FRANCIS IMLACH, M.D.

OF the treatment of various neurotic pathological conditions by removal of the uterine appendages I have little knowledge and less belief. By a curious coincidence, two entirely different motives appear to have suggested this much discussed surgical procedure almost simultaneously to men of different bent of mind. One motive may be termed transcendental, hypothetical, doubtful; it is determined by the belief that certain untoward neurotic manifestations depend upon morbid ovarian activity, and may be cured, and can only be cured, by removal of the ovaries. The other motive is commonplace, obvious, sure; namely, that disturbing, disabling and often more dangerous and even fatal conditions, due to acute or chronic inflammatory diseases of the uterine appendages can only be relieved, and ought to be relieved, by removal of the diseased parts.

It is by the latter motive I have been influenced, and the greater my experience becomes, the more convinced I grow of its soundness.

While in Tenby, however, at the new year, Mr. Beamish Hamilton asked me to see a hystero-epileptic patient, who might, he thought, be benefited by surgical treatment, and whose record may be useful at the present time. She was aged 40, and had been bed-ridden for the past nine years. At 20 or 21 years of age she became subject, she said, to epileptic fits, which had continued to the time I saw her. Indeed she appeared to have become bed-ridden almost as much from the increasing severity and frequency of the fits as from pain; her fits generally recurred three or four times in the day, and it was rare to pass a week with so few as four or five fits. She was always unconscious for ten or twenty minutes during a fit, but did not sleep heavily after it. Having been in five different hospitals, special and general, for periods varying from six weeks to four months, without relief, she had given up expectation of cure, and Mr. Hamilton informed me that bromides and other nervines appeared entirely useless.

It was plain, upon examination, that the Fallopian tubes were greatly distended, and I therefore advised their removal. Menstruation was very profuse, and there was great pain; my opinion was formed regardless of the neurotic condition which now, however, induces me to record the case in detail. At 28 years of age she married, and had a child, which died two years later. I have no record of the condition of the uterine appendages previous to this.

As I was unable to remain at Tenby, she was brought to Liverpool, entered my private hospital on January 10th, and four days later I removed her uterine appendages. It was a case of double hydrosalpinx, with extremely cirrhotic and shrunken ovaries. The right tube contained half a pint of serous, shreddy fluid, and the left about half an ounce. The left ovary was no larger than a dried split pea, and the right ovary about double that size (specimens shown). While being anaesthetised she had a prolonged and rather alarming fit: she became suddenly unconscious, her lips turned blue, respiration was arrested, and her back became strongly arched. An hour after the operation, which lasted only a few minutes, she had a similar attack, and, to our disappointment, a week later she had another, but no more.

On February 15th, being able to walk alone, she returned to Tenby, and the following letter was received on March 18th from her medical attendant, Mr. Hamilton:

"Tenby, March 17th, 1888. Dear Dr. Imlach,—In reply to your letter of queries about Mrs. B., she has been practically bed-

ridden for the past twelve years, since her 29th year, and has passed through the hands and treatment of many medical men, without getting the smallest benefit. Eight years ago she was kept upon her back for three months in the — Infirmary, and treated with pessaries, etc.; twelve months ago she was treated in the — Hospital with stem pessaries, etc., but without relief. For the past twenty-one years she has suffered from epileptoid seizures, accompanied with marked arching of the spine at the commencement of the attack, insensible for periods varying from ten to twenty-five minutes, for which she came under my treatment about eight months back; but nothing I could do seemed to mitigate them, and they were increasing in frequency and duration, when she had the good fortune to fall into your hands. Since her return home there have been only two fits of any severity, and they seem now to be amenable to bromides. Seven weeks from the day of operation she had a spurious menstrual flow, which lasted for five days. This made her nervous, and I think was the cause of the fits mentioned. She is eating well, her back-pain is gone, and I am only waiting for the fine weather to send her out of doors.—In great haste, yours very faithfully, BEAMISH HAMILTON."

As a primary result of the operation this is very encouraging. Had this treatment been carried out years ago, the patient would probably have been a useful housewife, free from pain, and a fit companion to her husband, in place of a hopeless and expensive invalid.

PRACTICAL ANTHROPOMETRY.

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

I HOPE that the suggestion thrown out by Dr. Stone in his Harveian Oration that "medical physics" shall form part of the science to be taught in the proposed laboratory for "scientific purposes" to be attached to the new Examination Hall of the Royal Colleges, will be acted on, and that practical anthropometry will form part of that important branch of the medical man's education. Anthropometry, or "man-measurement," strictly speaking, is a branch of human anatomy, and deals with the body as a living organism, while the anatomy taught in our medical schools deals only with the structural arrangement of its several parts; and it is obvious that if our students were properly taught, their first lesson should be to acquire a knowledge of the physical characters of the whole body before proceeding to study its elementary constituents. It is necessary, moreover, that, in order to practise his profession with satisfaction to himself, his patients, and, in public medicine, to the public, that the medical man should be acquainted with the normal condition of the body, and the variations in its conformation which result from race, sex, age, and sanitary surroundings. Besides being a branch of anatomy, anthropometry is a valuable means of diagnosis, not only for defining diseased conditions, but the influence of external agents on the growth and development of the whole body, or some of its organs. Indeed, in its widest sense diagnosis is anthropometry, for all our attempts at differentiation of diseases are measurements of either time or space, and all our instruments, whether for pathological or physiological investigation, are anthropometric instruments when applied to the investigation of the anatomy and functions of the human body. "The indispensable part of the experimental observation of physical facts is the measurement of quantities," says M. Henri Martin in his *Physiques*. "All physical objects are extended, and consequently measurable, though they may not always be measurable by the methods and instruments we possess; and all physical phenomena take place in periods of time susceptible of measurement, although some of the measurements are imperceptible by our senses. The right method as regards all these phenomena," he goes on to say, "is that taught by Galileo, to measure all that is measurable, and to endeavour to render measurable all that is not directly so." But while claiming for anthropometry this relation to medical physics, and thereby securing its recognition as an essential element of that much neglected branch of medical study, it is desirable in these days of the division of labour to confine the sphere of anthropometry to the study of the physical characters or qualities of the body, and to leave the subjects which have hitherto been included in the provinces of physiology and pathology, such as the functions of the senses and other obscure physico-psychological phenomena, which, though measurable by suitable instruments, can only be properly studied by persons

¹ Communicated to the North Wales Branch, March 20th, 1888.