PRACTICAL

PATHOLOGY

A MANUAL FOR STUDENTS AND PRACTITIONERS.

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CHAPTER 1.

POST MORTEM EXAMINATION.

1. Instruments required.

(a.) Two or three "section" knives, strong enough to be used as cartilage knives. The handle must be strong and thick, so that it may be grasped firmly in the palm of the hand; the blade stout, with the belly curved and sharpened up to the point, which should be well rounded off. With the knives (Fig. 1) made for me by Mr. Gardner of Edinburgh, there is little or no danger of punctured post mortem wounds.

(b.) A couple of scalpels, such as are supplied in the ordinary dissecting cases.

*(c.) For dividing the costal cartilages, Coats recommends a triangular knife with "a triangular blade, the edge being straight, and forming an angle of about 35° with the back, which should be very strong and thick; the handle should be strong, and the blade prolonged through it from end to end" (Lindsay Steven).

(d.) Two curved bistouries; one probe-pointed, the other sharpened up to the point.

*(e.) A hollow ground razor (Heifor's army razor), or better, a Valentine's knife, for cutting thin sections of fresh tissues.

(f.) A long thin-bladed knife, about one inch broad and ten or twelve inches long, for making complete sections through the various viscera. This is especially useful for cutting into the brain,

* Those marked with asterisk are not absolutely necessary for use in private houses, but they should be in every *post mortem* theatre.

but one rather shorter, though of similar make, is frequently used for cutting into the other organs. For the first incision into the brain a thin narrow knife, about one-third to one-half inch in breadth, and ten or twelve inches long, is also exceedingly useful, but by no means necessary.

(g.) A couple of pairs of dissecting forceps.

*(h.) Two pairs of double hooks well blunted, with chain, and a couple of copper spatulae.

(i.) Two pairs of scissors; “one pair large, having one blade with the point rounded off, the other sharp ; the other pair small, one blade probe-pointed, the other sharp-pointed.”

(j.) A pair of intestine scissors, with a long curved and blunt pointed blade with a hook turned backward, and a shorter square ended blade which closes behind the curve, so that the curved blade is never cut out of the bowel.

(k) A blowpipe, preferably with a stop-cock.

(l.) Several blunt probes, of different sizes.

(m.) A small bone-saw, with a strong moveable back and fine teeth, well set, and one with long curved handle for sawing through the laminae of the vertebrae.

(n.) A metal catheter, No. 8, and several flexible catheters.

(o.) A mallet - or steel hammer with a hook at the end of the handle, which is very useful in laying hold of and lifting the calvaria - and steel chisel, in the shape of a capital T; the blade and cross piece of the chisel should each be about 6 inches in length, and the blade, one inch broad, may be made with a guard at a distance of about one-third of an inch from the point. This guard is of use when the skull-cap is being removed, but it interferes with the use of the chisel for other purposes, such as taking out the spinal cord, so that when the guard is adopted a second straight steel chisel should be added to the list of instruments.

(p.) One pair of strong bone-forceps, the two ends of the handles of which should be at least two inches apart when they are forcibly gripped in the hand.

(q.) Three or four large straight flat "packing" needles, half a dozen curved needles, of different sizes, and some strong thin twine.

(r.) A pair of caliber-compasses, with graduated cross-bar, or narrow wooden foot-rule graduated in inches and centimetres. A yard or metre tape or steel band measure finely graduated in inches and centimetres. A series of graduated cones, from one-tenth inch to two and a half inches diameter, for measuring the various orifices. A large well graduated glass measure of about twenty ounce capacity, or even larger; this may be used for holding specimens, especially if it is fitted with a ground-in stopper. A smaller graduated beaker-shaped one ounce glass measure, which is often useful for taking out from small sacs and pouches in the peritoneal cavity.

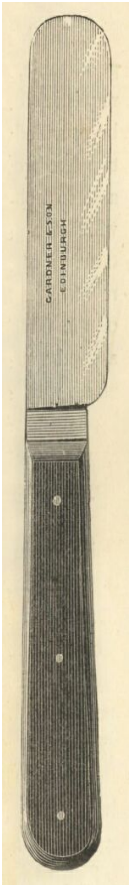

FIG I.

*(s.) A large trocar and cannula, or a flexible tube with rigid walls, to which a stomach pump may be attached, may be very useful for drawing off large accumulations of fluid, especially in cases of dropsical effusion

*(t.) A pair of scales, with weights from one quarter ounce to fifteen pounds.

(u.) Blue litmus paper and turmeric papers. A weak solution of
iodine, made by adding one drachm of tincture of iodine to eight or ten drachms of water. A solution of sulphide of ammonia to test for free iron derived from blood pigment, as in cases of pernicious anaemia.

*(v.) A good magnifying glass and a compound microscope with accessories, such as slides, cover glasses, a couple of needles in handles, a small phial of neutral solution (three-fourths per cent. solution of common salt in distilled water) - (§ 37).

Of these instruments those for cutting must all be perfectly clean and sharp, as nothing is more likely to interfere with the accuracy of the results of an examination than a set of blunt instruments - except want of method. It is needless to say, however, that *post mortem* examinations have to be made without many of the above instruments (and the lack of some of them should never be put forward as a reason for not making an examination), but

these, or substitutes for them, should be obtained when possible.

2. In the *post mortem* theatre of an infirmary all instruments, a good table, a plentiful supply of hot and cold water, and all the requisites for sponging the body and washing out the cavities should be provided. The best form of table is a slate slab six feet long and two feet broad with the corners rounded off, a bead round the edge, and so hollowed out that all fluids run to the lower or foot end, at which is a grating with a waste-pipe running to the centre, where the table is supported by a hollow iron pillar, on which it can easily revolve. A waste pipe passes down the central pillar; the height of the table should be about 2 feet 9 inches.' Above the table a good "star" gas light is essential for work in dark weather, and along with the gas pipe a pipe for the supply of water should be brought to a point above the middle of the table, to which an indiarubber hose may be attached; the hose should be kept out of the way by means of a hook, or some similar contrivance, when not in use. The gas and the water should both be controlled from a point within reach of the operator; this is usually done by having taps similar to those used in billiard rooms placed in the wall near the head of the table. For supporting the head and neck, a block about 15 inches long, 3 inches thick, and 9 inches broad, with half a circle with a radius of 6 inches cut out from one side, should be used; a number of blocks of a similar size, but without the excavation, and a few wedge-shaped blocks are also useful. For the examination of organs, a slate table, from 18 to 20 inches broad, with a couple of flat bottomed slate sinks, each 3 feet long and 4 inches deep, one fitted in at about 2 feet from each end, and with 2 feet between them, is a very convenient arrangement. The sink at the left should be used for washing out the intestines, and a nozzle should be fitted running parallel to, and about an inch from, the bottom of the sink, at the left hand corner. In the right hand sink it is well to have an ordinary tap to the right, and a pillar tap with a rose attached by a short indiarubber connection, about 4 or 5

[1] By a fulcrum and lever arrangement underneath the table, the body may be weighed as it lies in position.

inches long, so that it hangs vertically, when not in use, from an arm projecting from the back of the sink, this arm being so jointed that it can be turned out of the way of the operator. Hand-basins, with an abundant supply of hot and cold water, should also be within easy reach.

Where the examination has to be conducted in a private house, the lowing matters should be attended to beforehand:-

A good firm kitchen table is to be placed in the room where the cadaver is lying. (If this cannot be obtained, the coffin lid, or a door removed from its hinges and supported by a couple of chairs, is a good substitute.) The room should be well lighted, and as large and airy as possible; where it is small the windows should be thrown wide-open. A piece of stout Mackintosh should be spread over the table. A couple of wash-hand basins must be procured, two empty pails, a plentiful supply of water, hot and cold, a bottle of 1-20 carbolic acid (watery solution), some turpentine, and some carbolic linseed oil, 1-5. Dr. Lindsay Steven recommends a mixture thymol - half a drachm, and Vaseline - one ounce; and Dr. Harris of Manchester always uses a mixture of beeswax and vaseline, worked up in a mortar in such proportions that they form a kind of paste.

Clean rags, a number of newspapers, three or four sponges, a piece of soap and several towels, are essential.

The hands of the operator are first thoroughly washed with warm water and turpentine; a stream of cold water is then allowed to run over them; after which they should be thoroughly anointed with the carbolic oil; or if this is not at hand, with olive oil lard, or with one of the above mixtures. The palms of the hands should then be carefully wiped with a clean dry cloth, in order to allow of a firm grip of knives, or other instruments, being taken. From time to time during the section the stream of cold water should again be run over the hands, or they should be dipped and rubbed in a bowl of cold water placed between the legs of the subject. When the section is completed, the hands are thoroughly washed, first with cold and then with warm water, soap, and turpentine, and when the hands are clean, some of the carbolic lotion is poured over them, and allowed to soak in, before they are finally wiped.

If the skin is cut, scratched, or pricked, the hands should be at once cleansed, the wound sucked, and pure nitric acid or strong acetic acid applied to it; it should then be covered with a layer of flexile collodion, with good waterproof plaster (Seabury and Johnson's), or with an indiarubber finger-cap. If the hands are already cut indiarubber *post mortem* gloves, with *long sleeves,* should always be used.

In all private cases the *post mortem* examination should, if possible, be made before the body is "dressed," but if this has already been done the operator should always see that it is again dressed before he leaves.

3. As much information as possible should be obtained from the medical attendant, the friends of the patient, and from the police, in order that search may be made for special features due to accident or disease, and, before the section is commenced, a careful note should be made of the time at which the patient died, the interval (in hours) that has elapsed between the death and the examination of the body, and the external temperature and the temperature of the body. This is of considerable importance, as upon ' these factors depend the condition or state of preservation of the organs, and the degree of *post mortem* change, and it enables the observer in many cases to decide whether certain changes are *ante mortem,* or whether they have come about subsequent to the death of the patient.

4. The body, having been placed in the supine position, with a block under the shoulders and the head hanging well down, a careful and systematic examination of the external appearances of the body must be made, and the results noted down in as clear and accurate a manner as possible. This may be done in the following order:

Name, age, and sex (for reference), occupation, name of physician (and number of ward if in hospital), date of death and date of examination ; height (from vertex of the head to sole of the foot, in a line with the external malleolus); circumference around the shoulders ; circumference of skull around frontal and occipital protuberances (in the case of a child the shape of the cranium, the various diameters, and the condition of the sutures and of the fontanelles should also be

noted); the amount of adipose tissue, and the apparent state of nutrition of the body, whether it is emaciated or well nourished; the muscular development; and the shape and appearance generally of the head, thorax, and abdomen.

Next note the colour of the various parts of the body. Such parts as are reddened or otherwise discoloured should be firmly pressed upon with the fingers, and then examined to see whether the colour still remains *or not*. These discoloured patches should also be incised, and the colour of the tissues and the condition of the small vessels noticed. *Post mortem* lividity is always most marked in the dependent parts, except where pressure is exerted from the contact of the body with the table. Unlike the colour that arises from ecchymoses it disappears on pressure. When ecchymoses are cut into, the blood is found in the subcutaneous tissue, and can not be pressed out. A dark Fuller's earth blue or livid red colour, arranged in branching lines is often seen on the surface, especially about the sides of the neck and on the chest and arms. This is due to decomposition of the blood in the surface veins, and the diffusion of the colouring matter of the blood into the subcutaneous tissues. A careful search must be made for abrasions or eruptions, extravasations of blood, bed sores, ulcers, or any other evidences of a diseased condition, such as pigmentation of the skin or mucous membranes, or around old cicatrices, and these must be carefully described and recorded; scars, wounds, &c., on any part of the body, and their appearance, size, and position are also noted.

Determine what degree of *post mortem* rigidity has appeared or still remains in the various muscles of the body. Note whether there is any green coloration of the abdomen over the intercostal muscles, or in any part of the body. Such coloration, when present, points to the presence of pus or inflammatory products beneath, and is usually met with in cases of peritonitis and pleurisy, especially when the fluids have become purulent and over abscesses. Observe the eyelids, the tension of the eyeballs, the appearance of the cornea, and the relative size of the pupils. Examine the various orifices of the body - the nose and the ears for discharges of any kind, and for foreign bodies which may have become impacted; the mouth, about which should be noted the colour of the lips, the appearance and position of the teeth and of the lower

jaw, and the relation of the tongue to these. Here also look for foreign bodies, and in the fauces and larynx. Note the condition of the breasts, the state of distention of the abdomen, and see whether there are " linea albicantia " or not. The organs of generation are now to be examined for any abnormality or growth, and a careful search is to be made for any evidence of Inguinal or Femoral Hernia. (In the child it should be noted whether the testicles have descended.) The anus is to be examined in a similar manner for growths, scars, or fissures. In addition to the above it should be noted, in the case of a child, whether the anus is perforated or not, the condition of the umbilicus and the umbilical cord, the presence or absence of *vernix caseosa,* and the condition of the various epiphyses, especially of that at the lower end of the femur, which should be gradually cut away in very thin slices.

5. In making all *post mortem* examinations it is necessary to have certain well defined rules of procedure; and although, in a small minority of cases, these rules cannot be adhered to in their entirety, they nevertheless form a basis on which to work regularly and methodically. It will be found that the various sets of rules adopted by eminent pathologists are mostly based upon Virchow's method-a method which, with more or less modification, has found almost universal favour. In the following short *resumé* of the various steps to be taken in conducting a *post mortem* examination there is nothing original; it is an outline of a system that has been found to be exceedingly convenient, and very thorough. It is based upon that given by Virchow.[1]

6. It may be laid down as a cardinal rule that, where possible, all the cavities of the body are to be examined, and also that they

1 Those who require a full and accurate description of the manner of conducting medico-legal sections should consult Virchow's "Method of performing Post *Mortem* Examinations, with Special Reference to Medico-Legal Practice," translated from the German by Dr. T. P. Smith; also "*Post Mortem* Handbook for Clinical and Medico-Legal Purposes," by Thomas Harris, M.D., Lend., M.R.C.P.; and "A Text Book of Pathology" (Introductory Chapters), by Prof. Hamilton of Aberdeen..

are to be examined in a regular order (head, thorax, abdomen), which order should be rigidly adhered to, unless there be very good reason for departing from it. In certain cases the abdomen or the thorax may be opened and examined first; as for instance, when there is good reason to suspect some grave lesion or lesions in the viscera contained within one or other of these cavities, and where the removal of some of the organs might disarrange the relative positions of the diseased parts; otherwise, it is desirable to keep to the order and plan as closely as possible.

Before opening the head, however, it is well to open the other cavities, and make a preliminary examination of certain of their contained viscera. This may be done as follows:-

7. Stand on the right side of the body, and with a strong sharp knife, held in the palm of the hand, make a single incision through skin and subcutaneous tissue of the neck, commencing at the symphysis of the chin, continuing it down the middle line of the sternum cutting down to the bone, then through the muscular wall of the abdomen, passing round the umbilicus, and extending to the pubes; this part of the incision not being carried deeper than subperitoneal tissue. When the neck is not to be examined the lower margin of the thyroid cartilage, instead of the symphysis menti, may be taken as the upper extremity of the incision. At one point, a little below the ensiform cartilage, carefully dissect through peritoneum; pass the fingers of the left hand through the opening so made; raise the abdominal wall and complete the incision by cutting from within outwards, so as to avoid injuring any of the organs which are situated near the surface in the middle line. Examine the cut surface of the muscle, and note any peculiarity, such as pallor, hyaline patches (met with in Enteric Fever), or minute opaque white points, - encapsuled trichinae, which are found specially in the recti muscles; then make a careful search for any adhesion; should such be present, note its position before disturbing any of the organs. At the same time notice the relative position of the liver, the stomach, intestine, and other viscera to the costal and ensiform cartilages. As soon as the body is opened, and before oxidation of the colouring matter of the blood can

be brought about by the presence of air, observe the colour of the liver. Look carefully for perforations, faecal matter in the peritoneal cavity, constrictions of the intestine; examine the state of distention of the stomach; look for points of adhesion, perforation, or any evidence of inflammation. It is to be remembered that in all cases an external or a cut surface of an organ must be examined at once, and the colour noted, though these surfaces are also to be examined later, when the blood has become oxygenated, and has assumed the bright red colour commonly associated with arterial blood. The position of the diaphragm is to be carefully noted (the normal height on the right side is at the level of the fourth rib or the fourth intercostal space, on the left side, at the level of the fifth rib); and lastly, any fluid contained within the cavity is to be removed, measured, and examined, and any sign of inflammation, lymph, foreign body, or tumour is to be examined and accurately localised. The examination of the abdomen must, for the present, be carried no further; a partial examination of the thorax must now be made.

8. The soft tissues are most easily reflected from the chest by grasping firmly with the left hand the abdominal muscles attached to the lower ribs and drawing on them, whilst the knife is carried with long sweeps along the margins of the costal cartilages for some distance on to the ribs, and then, always cutting in the same direction, the whole of the costal cartilages, and three or four inches of the outer ends of the ribs and clavicle, are exposed. In order to obtain more room for examination of the abdominal cavity, it is often convenient to cut the attachments of the recti tendons just above and on each side of the symphysis pubis. Then remove the sternum. With a strong cartilage knife cut through the sternocostal cartilages as near to the end of the ribs as possible, and cut downwards, outwards, and backwards, following the line of the attachment of the ribs to their cartilages, commencing with the second rib and passing down to the ninth, the line of incision gradually curving outwards, this curvature becoming greater as the floating ribs are reached and cut through. If care be taken to carry the knife in an oblique

or slanting direction, the cartilages are cut through with comparative ease, but unless this direction be taken, it is often a matter of very great difficulty to divide these tough cartilaginous structures. When the cartilages have become ossified it is found impossible to divide them with a knife. Then, as the object is to gain free access to the chest cavity, the best plan is to divide the ribs with the saw or bone-forceps at some distance from the cartilages, great care being taken not to injure the visceral pleural sacs. Having separated the ends of the ribs, raise the sternum with the left hand, and carefully cut away the bone from the soft tissue beneath, making one cut downwards (towards the feet) to separate the diaphragm from its attachments to the lower end of the sternum, two lateral cuts above the curve already described, and then, after passing up the hand to feel for any mediastinal tumour or aneurism, pass the knife upwards to the manubrium, taking care not to injure the pericardium. Cut through the cartilage of the first rib (which is very frequently ossified), and disarticulate the clavicle. To divide the first costal cartilage the knife must pass a little further outwards than for the second rib, and, on account of the frequent ossification, it is often necessary to use the bone-forceps, even when the other cartilages have been readily divided with the knife. According to Virchow, "The best way to proceed is to insert the knife" (which should always be sharp and narrow) "with its edge looking upwards and forwards, under the cartilage of the first rib, below its inferior border, and then cut upwards and forwards." Divide the sterno-clavicular ligament, and turn the sternum backwards.[1] The next step is to open the pleural sacs, notice the position, state of distention, colour, and general appearance of the lungs, and look for any fluid, noting carefully whether it is blood-stained or not, then pass the hand between the two pleural surfaces, and make sure of the presence or absence of any adhesions or foreign body or tumour. Carefully remove and measure any fluid which may be present, just as in the case of the abdomen. Do not for the present attempt to remove the lungs, but note the condition of the mediastinum, the size and appearance of the thymus gland, and the

[1] I prefer to disarticulate the manubrium sterni, as on several occasions I have seen nasty scratches inflicted by the sharp edges of the divided bone, when the sternum has been sawn from the under side and broken across.

appearance of the vessels outside the pericardium; then open the pericardial sac by two incisions at right angles to each other, both extending from the lower and right side of the heart, one directly upwards, and, the other outwards to the left side. Look for points of adhesion, especially near the great vessels; notice the appearance of the surfaces of the heart and pericardium, and remove any serous fluid which may be in normal quantity, or in greater or less excess, also look for any blood, and again feel for any tumour or aneurism that might be present; and lastly, note the state of distention or contraction of the various chambers and vessels of the heart. Not until this point is reached can we commence to remove any of the viscera, as such removal is necessarily accompanied by a considerable loss of blood, which drains away from the heart, and so may alter very considerably the state of distention of the cavities of that organ, and its relations to the other viscera, and to the external landmarks.

9. The dissection now goes on regularly, commencing with the head and neck, and then passing downwards, taking the thorax and abdomen in order.

Head. - After a careful external examination of the head for wounds, ecchymoses, or disease, has been made, an incision is carried transversely over the vertex of the skull from behind the right ear to a similar point on the opposite side, cutting *outwards* after transfixing the skin, so as to cut away no more hair than is absolutely necessary, and also to keep the edge of the knife in good order. If this is not done, the hair should be carefully parted along the line of incision. Reflect the skin and pericranium over the occiput and over the forehead, exposing the occipital protuberance and the eminences over the frontal sinuses. Then carefully examine the soft tissues and the outer surface of the bones for any abnormal appearances, or for fractures or depressions; carry the knife round the skull at the level above indicated, and divide any adherent soft tissues and the temporal muscles (or turn down the temporal muscles with their aponeuroses), and saw through the dense outer layer and part of the inner porcellanous layer of bone in this circular direction, taking care not to allow the saw to pass through the

whole thickness of the skull. During this sawing, an assistant with his hands protected with a strong towel holds the head. The left hand of the operator should also be protected by a cloth. To complete the separation of the skull-cap use the mallet and steel chisel, breaking through the remainder of the inner table, unless a fracture of the bones of the skull is suspected, in which case it is better to use the saw more freely, even at the risk of injuring the membranes or the brain. In sawing through the calvaria, take care, in all cases, to go as deep as you intend at any one place before you leave it. Then, using the cross-bar as a lever, detach the skull-cap from the subjacent membranes. In most cases this is readily enough managed, but in persons who have suffered from chronic alcoholism, or who have been subjected to hard knocks or rough usage, it is not such an easy matter, owing to the presence of adhesions. In children, too, where the bones are still growing rapidly, there is, almost invariably, adhesion of the skull-cap to the dura mater beneath. In such cases, it is better to combine the removal of the bony cap with the next stage and take out the brain with skull-cap attached. Where the skull-cap can be detached, the appearances of the inner surface of the skull-cap, any thin points, or extreme thickening, and the outer surface of the dura mater and the meningeal vessels are to be noted, and the superior longitudinal sinus is to be laid open and examined.

Next make a small opening into the dura mater on each side, just above the bony margin, and pass in at each of these openings in turn a curved probe-pointed bistoury, carrying it to the mesial line on each side, backwards and forwards, so as to thoroughly divide the membrane; then with a pair of scissors cut through the attachment to the crista galli, and draw back the membrane,[1] falx cerebri and all, from the surface of the brain, leaving it attached at the position of the meeting of the sinuses. Examine its inner surface, the exposed arachnoid and pia mater, and then proceed to remove the brain. Whilst these operations are being carried on, the following amongst other points should be carefully noted:-

[1] Hamilton recommends that the falx should not be removed from the longitudinal fissure, because, if the brain has to be injected with a hardening fluid, this is apt to disturb the vessels.

The quantity of blood in the membranes and in the cerebral cortex; the quantity and nature of the fluid in the subarachnoid space; the breadth and depth of the sulci, and the breadth of the convolutions; any flattening or depressions, discoloration, or other marked alteration, such as lymph on the surface; haemorrhage of any kind; tubercle granulations on the pia mater, especially along the fissure of Sylvius, and at the vertex. Learn to distinguish these from the Pacchionian granulations for which they are sometimes mistaken.

With the fingers of the left hand draw back the frontal lobes, and carefully detach the olfactory bulbs from the cribriform plate with the handle of a scalpel; then, passing the fingers gradually further and further back, so as to support the brain, divide the optic nerves and the internal carotid vessels with a sharp scalpel as near their bony channels as possible. Passing backwards, divide the third nerves, the fourth pair as they lie in the margin of the tentorium cerebelli, and the sixth nerves, which are divided along with the tentorium. In the same manner the fifth and seventh are cut with the sharp bistoury, which is further carried along the margin of the tentorium, freely dividing that membrane at its point of attachment to the petrous portion of the temporal bone. Cut through the eighth and ninth nerves, then, with a long sharp-pointed bistoury, divide the cord as low down in the canal as it is possible to reach, and carefully tilt the brain backwards from the cranial cavity with the right hand, supporting it beneath with the left. Lay it aside until the examination of the inner surface of the dura mater at the base of the skull is completed.[1] Here look for any altered conditions or new growths. Slit open the various sinuses, and note their contents (as the state of distention of the right auricle has been already observed, it is not a matter of very great importance that the escape of blood should be prevented), examine the various vessels at their points of entrance to the skull, after which the dura mater may be detached with a chisel, and the bones at the base of the skull examined, especially the petrous portion of the temporal bone.

[1] To support the brain on the table, twist a cloth into a roll, make a circle with it, in the hollow of which the organ may rest.

10. Weigh the brain, - average weight of encephalon, male, 49-51 oz.; female, 44-45 oz - and note its relative weight to that of the body. Then dissect it. In making this dissection it is necessary (as in the dissection of all the viscera) to have two ends in view:- 1st. To make as complete a naked eye examination as possible; 2nd. To have the organ so cut up that it will be possible to replace each separate part in its proper position, to enable the operator to examine the organ as a whole, or to take any small portion from a precise given area. These ends may be attained in one of several ways, but it will be well here to give two methods, by either of which this examination may be made thoroughly and well. In either of these methods, Virchow's cardinal rules for the attainment of the object in view should be constantly borne in mind. They may be summed up as follows:- (1.) Make bold, free incisions by traction through the thickest, broadest, and longest part of the organ; 2.) Leave the fibrous covering of the organ, some of the vessels, or parenchyma of the organ, to keep the sections attached, at one edge.

(a.) Virchow's method slightly modified.- With a long, thin, narrow-bladed knife cut horizontally from within outwards into the hemisphere just above the level of the corpus callosum, leaving part of the brain attached to the lower, by the pia mater only, at its outer margin; make a similar incision into the opposite hemisphere. Then examine the lateral ventricles before any excess of fluid has time to escape, by cutting vertically down into the corpus callosum at a distance of one-sixteenth of an inch from the mesial plane, until at a depth of one-eighth of an inch the knife comes directly into the lateral ventricle. This incision is to be extended both backwards and forwards for some distance, in order to expose the "body" of the ventricular cavity (here also note the quantity of fluid that escapes). Then divide and subdivide times the upper portion of the cerebral hemispheres already turned outwards, always cutting from within outwards, and leaving some of the pia mater intact to hold together the wedge-shaped lamellae. To open into the anterior horn of the ventricle cut horizontally into the frontal lobe a little below the level of the body of the cavity, removing the brain substance above the incision.

The posterior horn is opened up in a similar fashion, the horizontal incision here, however, being made in a plane about three-quarters of an inch lower.

Now separate the pons, medulla, and cerebellum from the brain proper by cutting towards the mesial line in a plane the anterior border of which is just in front of the pons, the other border lying immediately behind the posterior pair of the corpora quadrigemina. A similar incision is made from the opposite side, when the cerebellum, medulla, and the upper part of the cord may be removed, and examined later.

"Having determined the contents of the lateral ventricles, the state of their walls and venous plexus, and the condition of the septum," says Virchow, "the latter is taken hold of with the left hand, close behind the foramen of Monro, the knife is pushed in front of the fingers through this aperture, and the corpus callosum cut through obliquely, upwards and forwards, and then all these parts (corpus callosum, septum lucidum, and fornix) are carefully detached from the velum interpositum and its choroid plexus. After these two latter have been exposed, we have to examine the state of their vessels and tissue. Then the handle of the scalpel is passed from the front under the velum, which is thus detached from the pineal body and corpora quadrigemina, the state of these parts is determined, and the third ventricle now exposed."

Then open into the aqueduct of Sylvius by making a vertical incision through the corpora quadrigemina. The corpora striata and optic thalami are further examined by means of numerous incisions, "whose common starting-point is the peduncle of the cerebrum. However great the number of these incisions may be - and it is necessary here to make numerous cuts - the relationship of the parts may always be closely preserved in consequence of the connection between each separate portion and the peduncle of the cerebrum."

Cut through the peduncles of the cerebellum, after which make free incisions into this organ in the positions already mentioned (i.e., to get sections having as large a surface as possible).

Treat the pons, medulla, and upper part of the cord in a similar manner, the transverse incisions to be at intervals of about from one-eighth to one-quarter of an inch, the pia mater and dura mater

being left uncut on the anterior surface to bind the sections together, and keep them in position.

In some few cases, as, for example, in the brains of hydrocephalic children, where there is great distention of the ventricles, it is sometimes found convenient to do the first part of the dissection into the ventricles whilst the brain is still *in situ,* or immediately after the skull-cap has been removed, and the membranes examined. In this way all risk of laceration of brain tissue and escape of fluid is done away with.

(b.) The other method - one especially adapted for the exact localisation of lesions on the cortex and the secondary changes in the lower parts of the brain after it has been carefully hardened – is that adopted by D. J. Hamilton from the French school. After removing the brain, injuring the carotid and vertebral vessels as little as possible, it is carefully injected with Müller's fluid for a week or two (see *Text Book of Pathology, vol. I., p.* 57), and then further hardened in Müller's fluid for several months. The cerebellum, medulla, and pons are then removed as in the first method, and a series of slices is made at right angles to the vertex, the brain being mounted on a board and all the sections being made parallel to one another, and at right angles to the superior longitudinal fissure, each slice being from one-sixth to one-half of an inch in thickness; the first section includes the tips of the frontal lobes, and the last the tips of the occipital lobes. Each slice is carefully examined, and by means of a small parchment or metal label, numbered and put aside for further more minute examination.

A modification of this method will also be found useful in certain cases. It consists in making vertical, more or less longitudinal, sections of the brain; the cerebellum, medulla, and upper part of the cord being left *in situ.* Where it is suspected that cortical lesions are followed by secondary degeneration descending to the cord this method is especially useful, as by making the sections in somewhat different planes the lesion may be pretty accurately followed.

11. The directions for taking out the *cord* may be now given, but it is better not to proceed with this until the thoracic and abdominal

viscera have been taken out, when, of course, the body is so much lighter.

The directions given by the German medico-legal authorities[1] are those which are almost universally followed.

The vertebral column is opened from behind. Place the body in the prone position with a large block supporting the thorax, and divide the skin and subcutaneous fat exactly over the spinous processes; and remove cleanly the nucleus "from the sides of these latter, and from the arches of the vertebrae. . . .

"Then, by means of a chisel, or a vertebral saw, if at hand, the spinous processes, together with the adjoining portions of the vertebral arches, are to be detached and removed." A pair of strong bone forceps, especially if bent at an angle on the flat as recommended by Dr. Savage, will prove extremely useful in removing the arch after the laminae have been partially cut with the saw or chisel. The removal is commenced as low as possible - at the 2nd or 3rd lumbar vertebrae. "The dura mater is now exposed, and after its external surface has been examined, it is to be carefully slit open longitudinally, and the presence of any serum or extravasated blood, or other abnormal matters, is to be determined.

"The colour, appearance, and general condition of the posterior portion of the pia mater are next to be noticed, and the consistence of the spinal cord is to be ascertained by gently passing the finger over it.

"The roots of the nerves are next to be divided on both sides by a longitudinal incision; the lower end of the cord is to be carefully taken out, its anterior connections are to be gradually separated, and, finally, the upper end is to be removed from the occipital foramen.

"In carrying out these directions great care must be taken that the spinal cord be neither pressed nor bent. When removed, the condition of the pia mater on the anterior aspect is first to be examined; then the size and colour (external) of the spinal cord are to be noted; and lastly, numerous transverse incisions are to be made with a very sharp and thin

[1] *See* Dr. T.P. Smith's translation, *loc.cit.*

knife, to determine the internal condition of the spinal cord, both of its white strands and of the grey substance." (These incisions should not be carried through the dura mater, which should be left attached to the posterior surface of the cord in order to keep the segments in serial position.) “The dura mater is then to be removed from the bodies of the vertebrae, and the dissector is to examine for extravasation of blood, injuries, or alterations in the bones or intervertebral cartilages.” The cavity should then be carefully examined for thickening or fracture of the bone, for caries, and for evidence of pressure of any kind, such as haemorrhage, tumours, or tubercular masses.

12. To return to the examination of the contents of the thoracic cavity. The various cavities of the *heart* must be opened separately whilst that organ still maintains its relative position to the surrounding structures. It is rotated from right to left, so that the right border of the heart may come to the front, and an incision is made into the right ventricle, commencing at the base, the knife being gradually withdrawn as it nears the apex. In the same plane make an incision into the right auricle from about midway between the two vena cavae to very near the base of the heart, then remove, measure and examine the blood from the right auricle, and examine the tricuspid opening with the fingers, from the auricle, taking care not to, interfere in any way with the segments of the valve. In the same way measure and examine the blood taken from the right ventricle.

To open the left auricle, make an incision, still in the same plane, between the left superior pulmonary vein and a point just on the side of the coronary vessels (in order that these latter may be left intact).

The left ventricle is also opened by a single cut from “just behind the base" to “just short of the apex," at a distance of about half an inch from the septum. The blood is removed from these two cavities and examined as before, and the size of the mitral orifice determined (see below).

Remove the heart by dividing the aorta and pulmonary artery at some little distance from it; note the size of the vessels, the thickness of their walls, or any abnormal condition, and then carefully clear out all coagula, not only from, these vessels but also from the various orifices,

and test the competence or incompetence of the aortic and pulmonary valves by means of a stream of water. To do this with the aortic opening, place the tips of two fingers - one in the right auricle and another in the left, and with the tips of one or two fingers of the other hand draw on the pulmonary artery. In this way an equal traction is made at three points, around and in the same plane as the closed valve. Allow water to run in from above, and see whether it runs away or not. If it does, and the water sinks rapidly, cut away the aorta down to within about one inch from the level of the valve, and note at what point the water escapes.

The pulmonary artery is to be tested in the same manner, by fixing the margins of the vessel with the tips of the fingers of both hands, and allowing the water to run in. Take the cone diameters of the various orifices where possible. To make the examination more complete, the cavities of the heart are still further opened up; the right ventricle, by passing a pair of bowel scissors into the opening already made, and cutting towards the pulmonary artery, care being taken to avoid injuring the "anterior papillary muscle of the tricuspid valve with its chordae tendinae." To open the left ventricle, cut with the scissors from the apex close to the septum into the aorta, passing "midway between the pulmonary orifice and the left auricle." The auricles are further opened by incisions, one running from the opening of the superior vena cava to that of the inferior vena cava, and that for the left running between the openings of the pulmonary veins. When the cavities are fully opened up, the appearances of the tricuspid and mitral valves are to be carefully observed, any thickening, contraction, roughening, or new growth, being fully noted and described. Then examine the endocardium, its colour, and the appearance of the muscle beneath, look for clots, especially in the right auricular appendix. Observe the consistence of the muscular tissue by compressing between the fingers, and then slit open the coronary vessels with a pair of probe-pointed scissors or a probe-pointed bistoury, look for contractions, atheromatous patches, and so on. Measure the length of the various cavities, the thickness of their walls, and weigh the heart. Average weight given by different authors - male, 9¾ to 13 oz., also given at 312 grammes; female, 9 to 10 oz. and 225 grammes - the highest weight in each case being the most accurate. After which examine the aorta for dilatations or

abnormal conditions of the inner coat especially; also examine carefully the pulmonary veins.

TABLE OF MEASUREMENT OF THE NORMAL HEART – *Hamilton*

DIAMETERS OF ORIFICES		CAVITIES AND WALLS	
Aortic	.9 to 1in.	Left Ventricle	3 to 3¾ in.
Mitral	1.2 to 1.4 in.	Wall	¼ in. (at thinnest)
Pulmonary Artery	1.1 to 1.2 in.		½ in. (at thickest)
Tricuspid	1.5 to 1.8 in.	Right Ventricle	$3^{1}/_{16}$ to 3⅜ in.
		Wall	⅛ in. (over all)

13. Lungs - After careful examination of the serous surfaces, which are usually somewhat altered in appearance if there is any fluid present, a careful search is made for any abnormal appearances. If there is any considerable quantity of blood in either of the pleural cavities, the aorta should be examined for aneurismal dilatations. This should also be done where there has been any evidence of pressure on either the lungs or the bronchi. To remove the lungs, seize the upper lobe with the left hand, and cutting from above downwards and backwards through the vessels and bronchi, as far from the point where they enter the lung as possible, and then through the broad pulmonary ligament. The left lung should be first removed and then the right, each being placed on its own side of the body on the table. Average weight - male, right lung, 24 oz., left lung, 21 oz.; female, right lung, 17 oz., left lung, 15 oz. If there are adhesions, localised or general, which cannot be broken down with the fingers, the costal pleura must be dissected away along with the lungs. Whilst breaking down these adhesions, or when working in the thoracic cavity, it is well to get an assistant to hold the reflected mass of skin and muscle over the ends of the ribs, especially when the cartilages are ossified, or where the saw has been used. Examine the outer surface of the lung for fibrinous exudation, colour, minute haemorrhages, fibrous adhesions, nodules, excessive pigmentation along the lines of the interlobular septa, miliary tubercles in the same position, emphysematous bullae, gangrenous sloughs, consolidated patches, cicatrices, or any other abnormal appearances, and note the colour of these patches, whether gray (catarrhal), yellow or caseous (tubercular), or red (infarction). Note whether these latter are wedge-shaped (at the

free border) or rounded (in the substance of the lung). This can only be made out after the lung has been incised. Then make a long free cut from apex to base, commencing at the outer rounded surface, and passing to the root, so as to bisect the bronchial glands, leaving the two portions attached by the vessels and bronchi forming the root of the lung. Then examine the cut surface, note the amount of blood on the surface, and how much may be squeezed out on pressure; note also how much air and serum may be squeezed out (oedema), and the colour of the serum (dirty brown in brown induration, bloody in acute congestion). Examine scrapings and consolidated patches, &c., as seen on surface; further examine the consolidated patches, and see if there are any cavities in them. Note the number and extent of these if present, especially when they are near the apex. Look at the walls and at the pleura above them; note their relations to the bronchi. Try the specific gravity of any consolidated or suspicious patches by placing them in water and noting whether they float or sink.

Observe the condition of the fibrous septa and of the pleural covering of the lung, the *bronchial glands* (enlargement, caseation, pigmentation), and then with a pair of scissors slit open the branches of the bronchus and pulmonary artery; note the appearances of these lining membranes, and also look for foreign bodies, clots, new growths, or any obstructive mass.

14. It is seldom necessary to examine the parts about the side of the *face and ear;* but when this is necessary, the various structures may all be exposed by continuing the vertical incision over the skull, down behind the ears to the neck, throwing the skin forward, so that it may be replaced at the conclusion of the dissection. (§29).

15. In the *neck* open the carotid sheath at once, after reflecting the skin, muscles, and fascia of the side of the neck and the floor of the mouth, and examine the vessels, the vagus, and the sympathetic ganglia; then dissect out the larynx, oesophagus, and pharynx *en masse,* and remove them along with tongue and soft palate by cutting through the muscles passing from the hyoid bone to the lower jaw, close behind the symphysis menti, and cutting along the rami back to the base of the skull. Free the upper part of the pharynx behind, draw forward the

tongue below the jaw, and then cut through the soft parts immediately behind its hard attachment, and remove the pillars of the fauces, the floor of the mouth being thus entirely detached. With the bowel scissors open up the oesophagus from behind; the larynx and trachea are also to be cut up from behind, care being taken to avoid injuring the oesophagus. The epiglottis and vocal cords can then be examined. Open the Eustachian tubes and examine for new growths, the condition of the mucous membrane, and then examine in turn the thyroid and salivary glands, the tonsils, and the cervical lymphatic glands.

Complete the examination of the abdominal cavity.

16. Take out the *omentum,* noticing any abnormal growths or appearances, redness, lymph, colloid mass, tubercle, thickening, contraction, or constriction of the intestine.

17. After noting the position and taking measurements whilst the organ is still *in situ*, remove the spleen by cutting through its vessels and peritoneal attachments. Weigh the organ (normal weight - male, 5½ oz.; female, 4¾ oz.) and examine the capsule for thickenings or alterations in colour. Make a free incision through the thickest and longest part; note the colour, consistence, amount of blood exuded, the appearances of the trabeculae, and of the Malpighian bodies. Pour a watery solution of iodine over the surface, and examine again, especially the Malpighian bodies. If there are any cicatrices, swelling, or other evidences of infarction, make other incisions in various directions.

18. Remove and examine each *kidney* separately, first the left, and then the right, placing each on its own side of the body; take out at the same time the corresponding suprarenal capsules and the semilunar ganglia. To remove the kidney make "a vertical incision through the peritoneum, external to and behind the ascending or descending colon; the intestine is to be pushed aside, and the kidney detached from its connections," by a single cut of the knife near the hilus. Remove the fat and other tissue from the capsule and weigh the organ (4½, oz. in the male, a little less in the female; left a little heavier, than the right), and

examine the outer surface for evidence of surrounding inflammation, then make an incision from the convex outer border of the organ down to the pelvis; note the relative thicknesses of the medulla and cortex, normally about 7:3 (Hamilton gives it 3:1). If there is any marked deviation from these proportions, examine the organ most carefully, and notice the amount of blood exuding from the cut surface, the colour of the cortex and of the medulla, especially at the bases of the pyramids. Then strip off the capsule, see whether it is thickened, adherent, or laminated. Examine the surface for "granulations," cysts, tubercles, cicatrices, depressions or elevations, or persistent marking out of the lobes; note the state of distention of the venae stellatae, the colour of the surface, and so on, after which try the consistence of the organ.

Note the size, patency, and thickness of the walls of the arteries in the boundary area, the regularity and the size of the Malpighian bodies, the appearances of the interlobular vessels in the cortex and the straight vessels and tubules in the pyramids, noting changes or accumulations in the tubules, especially near the apices of the papillae; look for cysts, and then examine the condition of the mucous membrane of the calyces, pelvis, and of the ureter, the latter of which should be slit up with a probe-pointed bistoury, unless it is deemed desirable to remove the kidney, bladder, and ureters together for more careful examination outside the body.

Stain a section with a watery solution of iodine (§1), and examine especially the Malpighian bodies and straight vessels.

In examining the kidney always commence at the capsule and work systematically towards the pelvis.

19. The *suprarenal capsules* are to be described as to size, colour, consistence, and appearances on section (induration, caseation, waxy appearance, for which apply the watery solution of iodine); examine along with them the *semilunar ganglia* of the corresponding sides, and any firmness of these ganglia is to be noted, or any signs of inflammatory thickening or pigmentation, where such are present. Preserve both of these structures for microscopic examination.

20. The *bladder* is next opened *in situ*, and any peculiarity of the mucous membrane - pouches, thickening of the walls, papillomatous growths, deposits of ammoniacal phosphates - observed. Remove the

pelvis, and examine the *prostate, vesiculae seminales,* and *urethra* for signs of inflammation, enlargement, or stricture; the *testicle* and *spermatic cord* are also examined for caseation, enlargement, or other changes.

21. In the female look for evidence of injury to the wall or peritoneal covering of the uterus; remove and note the condition of the *vagina,* search for ulceration, or new growths on the *os uteri.* Examine the *uterus,* noting its size, the thickness and consistence of its muscular wall, the condition of the mucous membrane, the corrugations *(arbor vitae)* at the neck, the appearances of the vessels, and also any new growths, and their positions; note the condition of the broad ligaments and the fallopian tubes; and look for corpora lutea, cicatrices, cysts, or new growths in the ovary.

22. Next cut out the *rectum* after placing on it a couple of ligatures; slit it up, and examine its mucous membrane; look for fissures, stricture due to new growths or other causes, for varicose conditions of the veins, &c.

23. At this stage Virchow insists that the *duodenum* and *stomach* should be examined for adhesions, perforations, or any other abnormal appearances, and should then be opened *in situ* by an incision (made with a pair of scissors) running longitudinally along the anterior surface of the duodenum and the greater curvature of the stomach. In all cases where it is suspected that traces of poison may be found in the stomach, the organ should be removed before it is opened, and at as early a stage of the examination as possible. A couple of *double* ligatures are passed, one round the upper end of the oesophagus, the second round the lower part of the duodenum. The interval between the parts of each double ligature should be at least an inch, in order that there may be no danger of the string slipping. Remove the stomach, with its contents, and then empty these contents into a clean bottle, after cutting the ligature at the duodenal end, after which the stomach may be examined. It is sometimes recommended that this method should be adopted in every case, and it certainly has the great advantage of cleanliness. Hamilton's plan of first making a short opening along the lesser curvature and then

taking the cone diameters of the two orifices is an admirable one. It may be carried out either when the stomach is opened *in situ* or after it has been removed. Determine the contents of the duodenum, "above and below the papilla biliaria; then this papilla should be examined, and its contents gently pressed out then, by pressing on the gall bladder, we should determine the presence or absence of obstacles to the flow of bile; and, lastly, the *ductus communis choledochus* should be slit up. Then the *vena cava* should be examined, especially where death from suffocation is suspected, and, all this having been done, the liver should be removed. It is quite useless to pass a probe along the gall duct, for our being able to introduce a probe into the orifice is no evidence whatever that the portio intestinalis was pervious during life."

The *stomach* should be examined at the same time as the duodenum, and any thickening of the pylorus, congestion, or ulceration of the mucous membrane noted.

24. Many pathologists remove the *liver* first, but it is better, in many cases, to leave it until this stage, in order that the relations of the organ itself, and of the gall duct and bladder to the stomach, duodenum, and head of the pancreas may be determined. To free it carry the knife through the arch of the diaphragm along the left border of the liver, then pulling the organ forward, sweep through the falciform ligament, and cut through the remaining attachments to the diaphragm, posteriorly. Slit open the gall bladder and look for watery or inspissated bile, gall stones, or any other abnormal condition; weigh (average weight - in the male 48-50 oz., in the female 41-42 oz.) and measure, note the shape, consistence, and resistance, and examine the external surface for thickenings or any abnormal appearance. Make sections through its substance transversely (from right to left), leaving the sections united by one edge at the under surface of the organ; note the toughness of the tissue as the knife passes through it, and test its consistence and friability with the fingers, observe the amount of blood contained, the size of the vessels, the appearance of the capsule on section, the amount of connective tissue, the colour and appearance of each zone of the lobules (before and after the addition of iodine solution), and the size

of the lobules; look for new growths, such as cancer, sarcoma, or tubercle.

After the removal of the liver, the stomach and duodenum, if not already removed, may be drawn upwards and excised by cutting parallel to the vertebrae through the head of the pancreas, and then pulling forward and cutting through the various posterior attachments.

25. Then examine the *pancreas,* especially at its attachment in the curve of the duodenum, for tumours or cysts, which are usually found in the head, - the part that lies in the curve, - and take out the semilunar ganglia, if this has not been done when the kidneys were removed; it is to be remembered that in some cases this is much easier to do at this stage, when the pancreas has been got out of the way, than earlier.

26. The *mesentery* and *intestines* are examined *in situ,* and any adhesions, new growths, enlarged glands, the condition of the *vessels* and *lymphatics* should be observed; then, taking hold of a loop, with a sharp knife cut through the attachment of the mesentery close to the intestine. The two extremities of the intestine have already been tied, and nothing remains to be done but to put on a double ligature at about one foot above the large intestine, drawing the intestine from the abdominal cavity as this is done; send a stream of water through it to wash out its contents, unless there are special reasons for examining these in the different parts of the intestine; and then slit up the bowel with the bowel scissors, taking care to cut through the walls at the point of attachment to the mesentery. Examine the mucous membrane for thickenings or changes in the various structures, congestion, ulceration, sloughing perforation, and so on; at the same time examine the mesenteric attachment for tubercle nodules along the lines of the lymphatics; typhoid swellings and ulcers are to be specially looked for, just above and below the ileo-caecal valve, whilst the valve itself should always be most carefully examined for tubercular ulceration, and, “in every case of peritoneal inflammation examine carefully the vermiform appendage.” Apply iodine to the mucous surface.

27. Lastly, examine the *retro-peritoneal glands, thoracic duct,*

receptaculum, chyli, aorta, vena cava, and the large trunks going into the pelvis; and also, if necessary, examine the sympathetic nervous trunks.

In certain cases other structures have to be examined, or more, particular attention has to be paid to certain parts; but the necessity for doing this will be indicated by the clinical history of the case. In such cases special dissections must be made.

28. Where it is necessary to remove the whole eye two saw cuts should be made, one vertically downwards through the frontal bone and the roof of the orbit, in a line corresponding to the inner side of the orbit as one extreme, and the inner side of the optical foramen as the other, the other line being drawn from the outer side of the orbit to the outer side of the optic foramen. As soon as the bone is cut through a sharp tap forward behind the frontal bone will cause the horizontal plate to tilt up; this allows of a complete dissection of the eye being made. The ring around the orbit foramen may be left *in situ* by chiselling through the thin plate of bone that lies in front of it. If the whole eye is removed, however, the face is somewhat disfigured, and as in most cases it is quite sufficient to remove the posterior half of the globe, all that is necessary is to smash in and remove the thin orbital plate of the roof with a pair of strong bone-forceps. The muscles and nerves can then be dissected out, and the posterior half of the eye may be removed with a pair of sharp-pointed scissors, the parts being held in position by a pair of forceps. A scrap of dark-coloured cloth held in position behind the pupil, with cotton wadding, prevents any disfigurement.

29. The temporal bone with its petrous portion containing the internal ear may be taken out and examined after removal of the brain by stripping off the dura mater from the base, dissecting off the skin and muscle, and detaching the external ear from the bone and disarticulating the jaw; then taking the margins of the temporal bone as the base of a pyramid, the apex of which is a little beyond the inner extremity of the petrous portion, two saw cuts are carried almost vertically downwards so as to bound the pyramid, and then with a bone chisel and mallet the whole temporal bone may be removed, after which it may be softened in a decalcifying fluid, or the internal ear may be dissected out with a small saw, a pair of sharp well-fitting bone

forceps, and a sharp gouge and chisel. The internal ear or tympanic cavity and mastoid cells may also be opened up with the aid of the above instruments.

30. The following method of examining the nose is one that I have sometimes used since I read Dr. Harris' little hand-book, from which the description is taken: -

"After the brain has been removed, and the base of the skull has been examined, the body of the sphenoid bone, a little in front of its line of union with the basilar portion of the occipital bone, is divided transversely with the aid of a chisel, and then by means of a small saw the base of the skull is divided along a line running on either side from the extremities of the incision in the body of the sphenoid, through the middle fossa on the outer side of the cavernous sinus, and thence forward through the lesser wing of the sphenoid to the anterior fossa, where the inner part of the orbital plate of the frontal bone on both sides is divided as far as its anterior extremity, and then the extremities of these incisions are united by a transverse one across the front part of the perforated plate of the ethmoid bone. We are then enabled, by means of a chisel and a pair of bone forceps, to remove the portion of the base of the skull included between the lines of incision, and to examine the interior of the nasal cavities."

AVERAGE WEIGHTS OF ORGANS.

Table used in the Post Mortem Room of the Royal Infirmary, Edinburgh.

	MALE		FEMALE	
	lbs.	oz.	lbs.	oz.
Human Brain,	3	1½	2	1½
Heart,	-	11	-	9
Lungs,	2	13	2	-
Liver,	3	5	2	12
Pancreas,	-	3	-	2¾
Spleen,	-	6	-	5½
	Right.	*Left.*	*Right.*	*Left.*
	oz.	oz.	oz.	oz.
Kidneys,	5¼	5½	4¾	5