Topographical Anatomy of the New-Born Infant.

A Thesis by

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Introduction

Methods, etc.
Introduction

It is my purpose, in this thesis, to describe the various sections and dissections which I have made of the newly-born child; and then to draw certain conclusions from these with regard to the topographical anatomy of the infant at birth. The methods employed were those of simple dissection, and of section after freezing. With regard to the method of dissection I need enter into no details. I simply dissected with scalpel and forceps from the skin surface inward in the manner which is employed in any anatomical school. With regard, however, to the method by freezing and section cutting, a few words of explanation may not be out of place.
Methods

Preparation of the Frozen Sections.

It may be well before describing the frozen sections in detail to give an account of the method employed in freezing and otherwise preparing them for examination. The method which I have employed agrees in the main with that introduced by Pirogoff and carried out by Braune, Luschka, Henle, Hart, Carbot, Symington and others, but differs in some of the details, more especially in that part of the process which is concerned with the accurate reproduction of the appearances seen immediately after the cutting of the sections.

In order for convenience describe the process of making frozen sections of the newly-born child in three stages: firstly, the freezing of the subject; secondly, the making of the sections; and thirdly, the pictorial reproduction of the appearances seen.
The freezing of the subject

The freezing of the subject is best carried out in a cellar or in a room in which there is no fire or hot-water heating apparatus. In the case of the sections about to be described the freezing process was carried on in the Laboratory of the Midwifery Department in this University, and during the process the room that kept cold by turning off the hot-water heating apparatus.

There was a large metal tank, with an outflow pipe, and in this tank was placed a large wooden packing-case which was perforated by numerous holes at the bottom and sides. The packing-case was filled into the tank and was lifted up so that one end was slightly higher, and this was done to facilitate the draining away of the water from the freezing mixture through the apertures in the wooden case. Having thus prepared the box...
in which the freezing process was to be carried out, we now proceeded to prepare the subject. In no case had the child been dead longer than twenty-four hours, and in no case had the body been placed in spirit. If the part to be frozen have been previously put in spirit or other preserving agent it will be necessary to thoroughly soak this out before the freezing process can be satisfactorily carried out. The box was now filled nearly half full with a mixture of salt and snow. First a thick layer of snow was placed in the box. Then a thin layer of salt was placed on the top of this, then more snow, then salt again, and so on alternately till the box was half full. Then the mixture was stirred vigorously about until water began to run through the holes in the packing case, a fact which showed that everything was working properly.
The dead child was now placed in the
position in which it was intended to be
frozen, thus in one case it was placed
upon the back with the head placed
upon the sternum and the thighs placed
upon the trunk, in another the head
and limbs were extended, and so on.
The position being in some cases secured
by passing ligatures round the child.
The subject was now enveloped in several
layers of mackintosh in order to keep
it dry, and it was then placed in
the middle of the freezing mixture and
more layers of salt and snow placed
upon the top and the whole was covered
over with packing or straw. It
was found to be better not to lay
for great an account of freezing
mixture upon the top of the subject
at first, as this might lay its weight
forces in the abdominal walls of the
child and so alter the position of
parts, hence the rule followed was
to place a small amount of freezing mixture above the subject, to begin with,
and then when the abdominal walls were frozen hard and rigid to fill up the box with freezing mixture to
the very top. The freezing mixture was
stirred up every six hours and fresh
salt and ice added until the
subject was frozen hard. In the case
of the newly born child the freezing
process was usually completed in from
two to three days if the weather con-
tinued cold; but in the case of the
adult, a longer time will of course
be required. If no snow can be obtained
it will be necessary to freeze with
ice and salt, a much more expensive
and laborious method than that just
described. The proportion of the ingredi-
ents in the freezing mixture is about
two parts of snow or ice to one part
of salt. I have found latterly that 18
hours is a long enough time to ensure
complete freezing in cold weather.
II

The Cutting of the Sections.

When the subject was found to be frozen hard, it was taken out of the freezing mixture, the macintosh was removed, and the cutting process was commenced. The subject was laid upon a piece of board, in which slits had already been made. The lines of section were now settled upon and it was found best to take certain bony points as landmarks. Thus, in cases where it was intended to make sagittal sacral sections, the tips of the vertebral spines, the occipital prominence, the nasal bone, etc. furnished us with landmarks. The sections were made with a thin, sharp, finely hoisted saw. The child was placed upon the board with the line of section situated immediately above one of the slits, and was fixed in this position by nailing pieces of wood on both sides of it. Accoutrements, whose hands were covered with flannel,
steadied the body, whilst the saw was introduced into the slit made to guide the line of section, and the sawing process was then quickly and continuously carried out. The surfaces of the section thus made were then carefully cleared up by brushing or scraping off the debris produced by the process of sawing. It is by some advised that the surfaces of the sections be washed, but it is in my opinion more satisfactory to reduce the dust lightly by a soft brush or piece of flannel. It is now advisable to place the sections upon porcelain trays and to pack them in position by pieces of ice, and this was the method employed by us during the time occupied by the tracing of the outlines of the section on gelatine plate which process forms part of the third stage of the operation, and has now to be described.
The drawing of the sections.

The third stage in the process consists in the production of faithful representations of the appearance of the sections at the time when the liquid in the parts has melted and before the normal colour of the tissues is lost. In making these pictures it is therefore evident that no time must be lost.

Pieces of glass, a little larger than the sections, were already prepared and on one side of each of these pieces was fixed (by means of gum paper) a sheet of gelatine. The glass was now laid upon the section, the side which was uncovered by gelatine being placed in contact with the tissues, and the outlines of the organs in the section which could be seen shining through were traced upon the gelatine by means of a sharp needle. In this way a scratched outline of the section giving the exact size, shape, and relation of
the parts was obtained. The dust from a black lead pencil was now scattered upon the scratched surface of the gelatin plate, the plate was then applied to a sheet of tissue paper and the two were squeezed together. The result of this was that the black dust lying in the scratches upon the gelatine had transferred to the tissue paper, and so an outline of the parts seen in the section was obtained upon the tissue paper. The sheet of tissue paper was not laid face downwards upon tightly stretched drawing paper and pressure was applied. In this manner an outline of the section was obtained upon the drawing paper, the details of which could be filled in subsequently. I much prefer this method to the other in which the outlines are traced by means of ink upon sheets of glass. By the gelatine method one can transfer to drawing paper a much more accurate repro-
Spiral Deformity in relation to Obstetrics.
sentation of the appearances seen in
the section. The colour of the various
organs and tissues in the sections
was now noted, and the sections
were then placed in methylated
spirit, the details being filled in
at leisure. It is important to note
the colours before the sections are
placed in preserving fluid as the
spirit rapidly bleaches the specimen.
The sections may be permanently
mounted in plaster of Paris by
the method detailed by Frederick
Barbour in his "Atlas of "Spinal
Deformity in relation to Obstetrics".
I have, however, in every case, after
the picture of the section has been
figured, proceeded to the further
description of the parts for the
purpose of clearing up any doubtful
points, and of studying the parts
underlying the surface of the
section. I have also, in the case
of each organ as the liver, spleen, lungs etc built up these organs from their various parts and so have been enabled to study again each tissue in its entirety.

I have often been struck by the fact that the opposite sides of a section did not exactly correspond and have found the explanation in the fact that however carefully and rapidly the sawing process be carried out an appreciable quantity of the tissues of the part is inevitably carried away upon the saw or is brushed off in the form of saw dust. The quantity of the tissue removed is of course small but it is quite appreciable and if this fact be not borne in mind false conclusions may be arrived at. The thickness of tissue removed probably never exceeds 1 mm.
Such was the method employed in the preparation of the proper sections which form the groundwork of this thesis. I have adopted the sectional method in most cases rather than the dissectional for the following reasons: firstly, because it gives a picture of the relations of the parts much more accurate than that which can be obtained by dissection alone; secondly, because by this method the surface landmarks are not removed; and thirdly, because in one case at least (the droopical child) no more dissection could have given an adequate idea of the relations of the organs and the droopical fluid.

On the other hand, as has been already stated, I have by no means confined myself to the sectional method for in some cases the method of dissection was alone employed, and in others both section and dissection were used the latter being employed to supplement...
and confirm the results obtained by the former method.

Further the help of the microscope was called into play in several instances more especially in regard to organs or tissues which appeared to the naked eye to be pathological. The sections for the microscope were hardened in Müller's fluid in the usual way and cut out by the ice-freezing method of Williams. The microscopic sections thus obtained were stained and mounted in the usual manner.

In one or two cases a chemical analysis of the wine, dextrocecal fluid, etc. was made and in one case an attempt, but an unsuccessful one, was made to cultivate the bacteria from peritonitic fluid. The cultivation experiment failed because the fluid had been frozen and the bacteria presumably killed.
Literature of the Subject

Whilst the literature bearing upon the subject of the anatomy of the infant is enormous, that which has relation to the investigation of the structure of the new-born by means of the sectional method is small in amount.

The references to special articles bearing upon the anatomy of the infant are given in connection with the text, but with regard to works upon the subject of the anatomy of the infant as revealed by frozen sections it may be well here to state that continual reference to the following contributions has been made:

L'Anatomie Topographique du Foetus. Ribemont. 1878
Anatomie des Kinderalters. Dr. Henke. 1881
Anatomie des Menschen. Rodinger. 1878
Anatome Topographica. Pirogoff. 1859
Frozen sections of a Child. Delight. 1881
Topographical Anatomy of the Child. Symington. 1883
Upon special points I have consulted the works of Braune, Euchka, Heule, Brun, Hart, Babouw, Steiger, Kailer, Chiara and others. The above-mentioned authors have all employed the method of investigation by means of frozen section.

The references to the works which I have named, and to various monographs or papers in general medical or surgical journals, or in the literature bearing especially upon diseases of infants and children, will be found embodied in the text of this thesis.
Part I.

Description of the Preparations.
Part I
Description of the Preparations.

In this, the first part of the thesis, I have described fully the drawings which were made of the various sections and dissections. In every case I have stated as fully as I could, the clinical history of the case, and I have also given the measurements of the child, and have noted any abnormal external appearances which might be present. I have named the cases A, B, C, D, E, F, G etc. for the sake of convenience, and it is to be noted that the cases in which the method by freezing was employed are cases A, C, D, E and F. In the other cases simple dissection alone was employed.
Description of the Sections in Case A

Clinical Notes of Case A. The child from which the following section were obtained was born in the Royal Maternity Hospital on the 18th day of February, 1888, at the hour of 4.50 p.m. For the following notes I am indebted to Dr. Leslie Taylor, resident surgeon to the Hospital, in Dr. Underhill's district. The mother was an unmarried primipar seventy-five years of age and healthy. The confinement was labours, the first stage lasted forty hours, the second four hours and a half, and the third twenty minutes. The whole labour lasting, therefore, for forty-four hours fifty minutes. The report states that 'forceps were applied for excessive delay in the second stage, and on getting the head to the vault the cord which was round the neck was found ruptured and the child
dead: a mass of calcareous deposits was found about the placenta and cord, and fatty degeneration also appeared to be present." The case was one of persistent right-occipito-posterior position (O.O.P.), and the child was a full-term male. The weight of the child was 7 lbs. 13 oz., and its length was 22 inches. Whilst the placenta weighed 1 lb. 5 oz., and the umbilical cord measured 25 inches in length.

The death of the child was manifestly due to the long delay in the second stage, and to the compression of the cord found round the neck at birth. The rupture of the cord was most probably due to the fact that it had been caught in the grasp of the blades of the forceps. The deceased state of the placenta would make such interference with the foetal circulation more likely to be fatal.
The Sections of Case A

The still-born male child, the notes of which have been enumerated, was placed in a freezing mixture on the afternoon of February 19th, the birth having taken place on the afternoon of the 18th. The body was frozen lying upon the back, the head was flexed upon the chest, and the thighs were abducted and rotated slightly outwards. The importance of the position of the body will be seen when we come to consider the curves of the spine.

The following sections were made in the manner which has just been described:

I. Vertical Sections

1. Medial sagittal section. Case A. Plate I

2. Lateral sagittal section, 3/4 view to the left of No. 1, left looking towards the right Case A. Plate II

3. Opposite side of No. 2 section looking towards the left Case A. Plate III
II Transverse Sections. (of right half of body)

1. At level of eye and a little below level of external auditory meatus. Plate IV
2. Opposite side of the above section looking downwards. Plate V
3. At level of cartilage between the 3rd and 4th cervical vertebrae. Plate VI
4. At level of upper part of the body of the 1st dorsal vertebra. Plate VII
5. At level of upper part of the body of the 5th dorsal vertebra. Plate VII
6. At level of lower part of the body of the 7th dorsal vertebra. Plate IX
7. At level of the disc between the bodies of the 10th and 11th dorsal vertebrae. Plate X
8. At level of the middle of the body of the 1st lumbar vertebra. Plate XI
9. At level of the middle of the body of the 4th lumbar vertebra. Plate XII
10. At level of the body of the second piece of the sacrum. Plate XIII
Plate I Case A.

This plate represents the left side of a vertical median sagittal section of the head, neck, and trunk of the child named Case A. The freezing process occupied three days and the child was placed in the position already described. In cutting this section the saw deviated slightly to the right side of the middle line in the regions of the head and neck; in the thoracic and in the upper part of the abdominal region it followed very closely the middle line; but it deviated again to the right side in the pelvic region and to such an extent that the thoracic spinal canal was not opened into nor were the bones of the coccyx rendered visible.

He may describe in order the structures to be seen in the regions of the head, neck, thorax, abdomen, and pelvis; the spinal column being common to four of these regions may properly be first considered.
The Vertebral Column.

The Spinal Curves.

The curves of the spinal column are not consolidated at birth, hence the curves which are found upon making sections will depend very much upon the position in which the child was placed during the freezing process. From this section we see that there is a spinal concavity forwards in the cervical and upper dorsal regions, and a convexity forwards in the lower dorsal and in the lumbal regions. By making a little dissection in the sacro- coccygeal region I was able to demonstrate a concavity forwards there. The child was, as has been stated, placed in the freezing mixture with the head flexed upon the sternum, the arms by the sides, and the thighs abducted and rotated slightly outwards. We find, therefore, in this section what we should a priori have expected, the presence namely of
a concavity forwards in the cervical and upper dorsal regions, and a concavity forwards in the lower dorsal and lumbar regions. We shall return to the question of the production of these curvatures when we come to compare this section with those which have been made by Byrnside, Dwight, Ribemont and others.

Accurate measurements were made of the vertical diameter of the vertebral bodies, and with the exception of the lumbar vertebral bodies measured the same anteriorly and posteriorly. In the lumbar region the anterior vertical diameters were slightly less than the posterior vertical diameters. The following were the vertebral measurements:

**Vertical diameters of the vertebral bodies:**

- Anterior arch of atlas = 4 mm
- Posterior arch = do.
- Nucleus vertebrae with odontoid process = 1.2 cm (½ in).
- Third cervical vertebra = 5 mm (⅜ in.)
- Seventh do. do = 6 mm (¼ in.)
Sixth dorsal vertebra = 8 mm. (5/16 in.)
Twelfth do. do. = 8.5 mm. (fraction over 5/16 in.)
First lumbar vertebra vertical anterior = 1 cm. (5/16 in.)
do posterior = 9 mm. (fraction over 1/2 in.)
Fifth lumbar vertebra = 1 cm. (do.)

Antero-posterior diameters of the vertebral bodies:
Anterior arch of atlas = 3 mm.
Axis vertebra (body of) = 9 mm.
Third cervical vertebra = 9 mm. (a little too)
Seventh do. do. = 8 mm. (5/16 in.)
Sixth dorsal vertebra = 1.1 cm. (7/16 in.)
Twelfth do. do. = 1 cm. (5/16 in.)
First lumbar vertebra = 1 cm.
Fifth lumbar vertebra = 1.2 cm.

We see therefore, a gradual increase in the vertical and antero-posterior diameters of the bodies of the vertebrae as we proceed from the upper cervical to the lower lumbar region. The ratio of increase is almost identical with that seen in the child and adult.

(See Cymington's Plate 1, 2 & 3.)
The vertebral column, (cont).

The length of the regions of the spine. Measurements were made of the length of the various regions of the spine as seen in this section, and the following figures were found:

Vertical measurement of
Cervical region of Spine = 4.4 cm.
Dorsal do. do = 8.7 cm.
Lumbar do. do = 5.4 cm.
Sacro-coccygeal region = 4.3 cm.

The vertical measurement of the whole vertebral column from arch of atlas to tip of coccyx was nearly 23 cm (quotas).

We see, therefore, from these figures that in this case the cervical and the sacro-coccygeal spines are nearly equal in length, whilst there is a difference of one centimeter between the cervical and the lumbar spines, the proportion being cervical 4.4 to lumbar 5.4. The importance of this difference between the cervical and lumbar region will be seen when we
come to consider R. B. j's measurements of the cranial regions in newly-born children. The dorsal region is much longer than any of the other regions, it is equal to the cervical and sacro-coccygeal regions combined, and it is nearly equal to the combined length of the lumbar and sacro-coccygeal regions.
The Vertebral Column (cont.)

The ossification of the spine.

Several points in connection with the ossification of the spine are to be noted in this section.

We observe the presence of an ossific centre in the body of each vertebra. This centre increasing in size as we proceed from the cervical to the dorsal and lumbar regions, having a somewhat oval shape the long axis of the oval running anteroposteriorly, and being surrounded on all sides by cartilage. In the case of the axis vertebrae the ossific centre of the body is entirely separated by cartilage from that of the odontoid process, there being no trace of ossific union between the two along either the anterior or the posterior margin. The anterior arch of the atlas vertebra is cartilaginous ossification not beginning till after birth.

The posterior arch is ossified (see Part II) the spinous processes vary in the degree
of their ossification which spreads from the lateral centres for the arch; the secondary centres for the tips of the spines do not appear till later. In the spinous processes of the cervical vertebrae we note that no great amount of bone has been formed, but in the spines of the upper dorsal and lumbar vertebrae we find ossification far advanced except at the tips where the epiphyses are to appear.

There are as might be expected no traces of epiphysial plates in connection with the bodies of the vertebrae.

A little dissection revealed the fact that the last two sacral and all the coccygeal vertebrae were still cartilaginous.
The Vertebral Column. (cont.)
The Spinal canal.
The vertebral canal is divided vertically from the foramen magnum to the upper part of the sacrum. In the sacral region, as has been noted, the canal deviated to the right and therefore the sacral part of the spinal canal was not opened into. In the upper part of the canal we can trace the spinal cord passing up into the medulla oblongata and Pons; in the cervical region we can see that the spinal cord has been divided medially; but in the dorsal region the cord is not clearly seen, only the spinal membranes being left.
In the lower dorsal region, however, the cord reappears; and in the lumbar region we note the commencement of the cauda equina which in the sacral region is seen passing into the sacral canal. The absence of the cord in the dorsal region is due to the fact that the
Spinal nerve tissue, being soft, fragile, and loosely attached, was carried away upon the saw during the process of cutting.

It can be seen that at the lower part of the body of the first lumbar vertebra the spinal cord proper stops, and the cauda equina commences.

Dissecting the mutilated condition of the spinal cord we can trace both in the cervical region opposite the bodies of the fourth and fifth cervical vertebrae and in the lumbar region opposite the body of the last dorsal vertebra, indications of the cervical and lumbar enlargements respectively.

The total length of the spinal cord from the medulla to the commencement of the cauda equina is 14 cm. (5 1/2 inches).
The Region of the Head.

The Cranium

In this part of the section the saw passed a little to one side of the middle line and hence neither the brain nor the bones of the cranium have been divided exactly in the median plane. The deviation was partly due to the fact that the head was somewhat distorted by the pressure to which it had been subjected whilst lying in the saggital-occipito-posterior position in the pelvis of the mother.

The thickness of the cranial bones is seen to vary: thus at the region of the occipital protuberance the bone measures 2 mm, at a point in the frontal bone below the anterior fontanelle it measures 5 mm, whilst elsewhere the bone measures a thickness of 1.5 mm.

There is no trace to be seen of either the frontal or ethmoidal air sinuses, and this is what would have been anticipated for, according to the researchers
of Tillman, Steiner, and Symington the frontal sinuses, at any rate, do not appear before the sixth or seventh year of life at the earliest.

The cranial vault is seen to be deficient in the region of the anterior and posterior fontanelles. A little dissection was necessary to bring out the extent of the anterior fontanelle or bregma which is situated at the junction of the anterior and of the occipital sutures, the two sides of the coronal suture, and the posterior end of the persistent frontal sutures. The anterior fontanelle measures 112 inches from before backwards in the middle line and has a distinct lozenged shape. The posterior fontanelle, situated at the junction of the posterior end of the occipital sutures and the two halves of the lambdoidal sutures, is much smaller than the anterior, and the tip of the occipital bone is to be seen lying under the margins of the two parietal bones in the middle line.
The subadjacent position of the tip of the occiput points to the existence during labour of considerable pressure in the sub-occipito-bregmatic plane of the head. The left parietal bone overrode the right to a considerable degree at the sagittal suture. This over-riding of the parietal bones will be discussed later, but it should be borne in mind that in this case the head lay in the O.P.D. position. The anterior-posterior diameters of the head as seen in this section measured: (a) the mental-occipital, 5 in (12.8 cm); (b) the occipital frontal, 4 1/2 in (11.5 cm); and the sub-occipito-bregmatic, 7 1/8 in (18.4 cm); maximum, 5 3/4 in (14.7 cm).

In taking the head measurements in this and in all other cases I have adopted the definitions of the diameters decided upon by the Obstetrical Nomenclature Committee. Thus: (a) From the tip of the occipital bone to the lower margin of the chin = Diameter occipito-mental. 6 M.; (b) From the occipital...
protuberance to the root of the nose = Diameter occipito-frontalis, O.F. (a) From the point of union of the neck and occiput to the centre of the anterior fontanelle = Diameter sub occipito frontalis, s.O.B. (d) Between the two parietal eminences = Diameter Bi-Parietal, P.P. (e) Between the two lower extremities of the coronal suture = Diameter Bi-Temporalis, T.T.

The Cerebrum and Cerebellum are seen to be both divided a little to the right of the middle line, and a layer of brain tissue 1/8 inch thick must be removed before the false cerebi and the medial structures are rendered visible. The tentorium cerebelli is seen running backwards and dividing the cerebrum from the cerebellum. The grey matter on the surface of the cerebrum is seen lining the convolutions and running into the sulci.

The pituitary body is seen lying in the sella turcica of the sphenoid bone.
Several points in the rectification of the bones of the skull can be made out in this section. Thus, we note that the basis-occiput is separated from the basis-sphenoid by a plate of cartilage, also that a thin cartilaginous septum divides the presphenoid from the basis-or post-sphenoid, whilst in the region posterior to the foramen magnum cartilage intervenes between the basis-occiput and the supra-occiput. The dorum sellae in the sphenoid bone sloping upwards and forwards in continuation of the basilar groove of the occiput is seen to be cartilaginous. The olivary processes of the sphenoid is seen lying immi-
mediately above the cartilaginous plate between the pre- and post-sphenoid.
The Region of the Head (continued).

The Face.

In the region of the face the section has passed slightly to the left of the median line, then for the perpendicular plate of the ethmoid and the vomer are not seen whilst the measures of the left side of the nose are exposed to view. This section therefore opens into the cavity of the pharynx, the buccal cavity, and the nasal measures of the left side.

The three measures of the left nasal fossa are well displayed, we note the superior measure measuring 1.5 cm in length and passing forwards between the superior and inferior turbinate parts of the ethmoid; the middle measure, 1.8 cm in length, passing between the inferior turbinate part of the ethmoid and the inferior spongy bone; and, thirdly, the inferior measure, the longest and largest of the three being nearly 2 cm in length, passing between the inferior spongy bone and the floor
of the nasal fossa. Into the inferior meatus opens the nasal duct by a very small aperture. The fourth meatus of the nose, or recessus spheno-ethmoidalis as it has been called by Meyer, is not present in this specimen. When present it divides the inferior turbinate part of the ethmoid into two portions, the upper being called the concha eustrema.

The floor of the nasal fossa is composed of the palate plates of the superior maxillary and palate bones as can be seen, and the nasal fossa is seen opening posteriorly into the upper part of the pharynx (posterior nares).

The left nostril is cut wide, but owing to the depressed condition of the nose in this child it is not very evident. An occasional tooth gum is seen cut through in both the superior and inferior maxillary bone.

The lips are seen lying in contact with each other but the gums are separated from
Sketch of the left side of section shown in Plate one, in the region of the neck.
one another by the tip of the slightly pro-
truded tongue.

Let us now look at the cavity of the mouth
as displayed in this section.

Since the dorsal surface of the tongue is in
close apposition with the roof of the mouth
a buccal cavity properly so-called cannot
be said to exist in this case. The floor of
the mouth is seen to be made up of the
hard palate and the soft palate. The hard
palate in this case measured 2.5 cm (1 inch) in
length, the soft palate nearly 2 cm (¾ inch),
and the whole roof of the mouth is 4.5 cm
or 1¾ inches in length. The uvula, attached
to the posterior end of the soft palate in the
middle line, is not seen in this section as
the uvula passed a fraction of an inch to
the left side of the median plane, but in
the additional drawing (fig. 201), this
point and several others are brought clearly
out. The posterior extremity of the soft
palate is seen to be tilted upward and
in this way conceals from view the opening
of the Eustachian tube which lies immediately behind it. By turning the soft palate downwards, the Eustachian tube is seen lying in the same plane as the inferior meatus of the nose and immediately below the pituitary body, that is to say a line drawn directly downwards from the pituitary body would in this section pass through the pharyngeal end of the Eustachian tube. A line drawn forwards from the anterior part of the atlas vertebra would also pass through the end of the Eustachian tube.

It is to be noted that the gums of the superior dental arch are separated from those of the lower by a distance of 8 mm and this even although the head was fixed during freezing. The separation of the gums seen when the mouth is closed is a fact in the anatomy of the infant which Sepperson emphasizes. In this case one must bear in mind, however, the slight protrusion of the tip of the tongue. The muscular structure of the tongue is 26
in section and under the tongue are the genio-hyo-glossus, the genio-hyoid, and
the mylo-hyoid muscles.
The epiglottis is not seen in this section
as the saw has passed to the left of it.
but in the drawing of the opposite side
of the section (Fig. 1) it is to be seen.
From Plate I and Fig. 1, a good idea is
obtained of the size, shape and relations
of the pharynx in the child. From the
roof of the pharynx which is formed by the
Hyaloid process of the occiput to its lower
termination in the recesphage the pharyngeal
cavity has a vertical measurement of 1 cm
(nearly 1½ inches). Usually the pharynx has its
walls in apposition except in that part which
lies behind the posterior nares above the
velum palati, but in this case from the
right protrusion of the tongue and the
tilting up of the soft palate that part
which lies behind the buccal cavity has
not its walls in close apposition but forms
a distinct space. In this section we
note opening into the pharynx. The posterior
part of the left side of the pharynx, the
left end of the tube, the buccal cavity, and
the upper end of the oesophagus. The
pharynx is seen to become continuous with
the oesophagus at the level of the body of the 6th
cervical vertebra and a little below the ring of
the cricoid cartilage, but this is an anatomical
detail which is more properly considered under
the region of the neck. In the posterior wall
of the pharynx, the constrictor muscles are seen
but across and behind them are the prevertebral
muscles. In Fig. 1, we note the opening into
the larynx, with the epiglottic attached to
the tongue.
The Region of the Neck

The section shown in Plate I has in this region as in that of the face passed slightly to the left of the medial plane, so we again have to refer to Fig. 1 for the full details of the structures of the neck. We have in this region to note the larynx, trachea, thyroid gland, and hyoid bone. With regard to the general relation of these parts to each other it is to be noted that as the head was flexed upon the chest there was descent of the hyoid bone and consequent obliteration of the thyro-hyoid space.

The larynx.

The vertical extent of the larynx measured from the upper border of the epiglottis to the lower margin of the cricoid cartilage was 1.14 cm or 9/16 inch. The opening into the larynx from the pharynx was at the level of the middle of the body of the axis vertebra, whilst the commencement of the trachea was at the level
of the disc between the 5th and 6th cervical vertebrae. The epiglottis was at the level of the disc between the 2nd and 3rd cervical vertebrae. (Fig. 1.) The thyroid cartilage corresponded to the 3rd and 4th cervical vertebrae. The anterior part of the cricoid cartilage corresponded to the disc between the 5th and 6th cervical vertebrae, whilst its posterior portion corresponded to the body of the 4th cervical vertebra, the disc between this and the following vertebra, and to the upper part of the body of the 5th cervical vertebra. The whole larynx, as measured above, reached from the disc between the 2nd and 3rd cervical vertebrae to the disc between the 5th and 6th cervical vertebrae. This measurement is especially important in frozen sections for in them the parts are in position and have had no opportunity of shrinking whereas after the larynx has been separated from its surroundings it is ask to change its proportions. Symington
in his Atlas states that the vertical extent of the larynx in the full time child is "almost exactly half that of the anterior surface of the cervical part of the spine," but this section does not support this statement as the larynx measures 1.4 cm. and the cervical spine 4.4 cm.

The epiglottis, not seen in Plate 7, is displayed in Fig. 1. Its anterior surface is seen to be free only at its upper part, below it is in relation to the membrane passing between the hyoid bone and thyroid cartilage; posteriorly the epiglottis is seen to be free in its whole extent. In this figure it is seen that the larynx is covered in front by the skin and subperitoneal tissue alone, whilst posteriorly we find lying the pharynx and then the prevertebral muscles. The laryngeal sinuses between the true and false vocal cords is seen to be at the level of the disc between the third and fourth cervical vertebrae.
The Hyoid Bone

The hyoid bone is seen in Plate 1 and Fig 1; it is also seen, as will be afterwards noted, in its lateral relations in Plate VI. From the flexed position of the head of the child during freezing the hyoid bone is found lying almost in contact with the upper margin of the thyroid cartilage of the larynx. The hyoid bone is seen to lie at the level of the lower part of the body of the third cervical vertebra, and the distance from the hyoid to the manubrium sterni is found to be 2 cm or 3/4 inch. Several muscles are seen to be attached to the hyoid bone as the stylo-hyoid, genio-hyoid, and genio-hyo-glossus, and between it and the thyroid cartilage we find the thyro-hyoid membrane. The base hyoid in which is the portion of the hyoid bone divided in this section is seen to be cartilaginous, but it is stated that a centre of ossification appears in it in the last month of intra-uterine life.
The Trachea

The trachea is seen lying partly in the region of the neck and partly in that of the thorax for in the infant the larynx is situated at a higher level in relation to the vertebral column than in the adult. The length of the trachea in this specimen was 3.2 cm (1.25 inches), and it extended from vertically from a point opposite to the disc between the bodies of the 5th and 6th cervical vertebrae to the upper part of the body of the 4th dorsal vertebra. The bifurcation into the two bronchi is therefore, a little lower than the average point given in the case of newly born children, namely the 3rd dorsal vertebra, but this may be explained by the flexed position of the head in this specimen. The size of the lumen of the trachea is 3 mm, and this measurement is of importance in the construction of tracheotomy tubes for use in newly-born children. The trachea was noted to contain mucus and air bubbles.
The Thyroid Gland

The lobe only of the thyroid gland is seen in this section. It lies opposite to the bodies of the 6th and 7th cervical vertebrae and the intervening disc, and covers the front seven rings of the trachea. This case, therefore, would not have been an easy one in which to perform tracheotomy.

The Thymus Gland.

In the region of the neck only a small part of the thymus is found in the midline, hence it will be best to defer the consideration of this gland.

The Pharynx has already been considered along with the buccal and nasal cavities, and the oesophagus will be considered as one of the thoracic contents.
The Region of the Thorax

In this region of the preparation the saw has followed very closely the middle line, and in it we have to note the thoracic wall, the thymus gland, the heart and great vessels and pericardial sac, the trachea and the oesophagus.

The thoracic walls, size of the thorax, etc.
The posterior wall in the middle line has been considered under the spinal column. The anterior wall in the middle line is formed by the sternum. The upper margin of the manubrium sterni is placed higher in newly born children than in adults. It is usually stated to correspond to the level of the middle of the first dorsal vertebra whilst in the adult it is opposite the lower border of the second dorsal vertebra. In this case the upper margin of the manubrium sterni is exactly opposite to the middle of the body of the first dorsal vertebra, the head being flexed. The
tip of the omphalomesenteric duct lay at the level of the diaphragm between the tenth and eleventh dorsal vertebral bodies; but since this is a varying measurement we take the point on the vertebral column corresponding to the position of the central tendon of the diaphragm, in this case the disc between the 8th and 9th dorsal vertebrae. This measurement agrees exactly with that which Symington gives as the average one. The following were the antero-posterior measurements of the chest in the middle line of the body:

- From the 4th dorsal vertebra to the junction of the second costal cartilage with sternum: 4.5 cm
- From the 8th dorsal vertebra to the fourth piece of the sternum: 5.0 cm

The transverse measurements of the thorax, made from the other sections varied according to the level from 4 to 4.5 inches. In this child then we find that the transverse measures twice as much as the antero-posterior diameter of the chest,
and this is found to be the average proportion in the child. In the adult the transverse measures three times as much as the antero-posterior diameter. The sternal in this case measures from the manubrium to tip of cartilage 7.5 cm. or a little over 3 inches. In the sternum we note five ossification centres, one large one in the sternum or manubrium, four smaller ones in the meso-sternum, and no trace of ossification in the meta-sternum. The upper part of the sternum is still cartilaginous, the meta-sternum is entirely cartilage, whilst large cartilaginous areas intervene between the ossification centres of the body. It is usually stated that at birth only three ossific centres exist in the body of the sternum, but in this case it is clearly seen that the one for the fourth piece of the body has also appeared. The thickness of the sternum varies from 6 mm. in the sternum to 5 mm. in the meso-sternum and to 2 mm. in the meta-sternum.
The Thymus Gland.

In this section, the thymus gland is divided very nearly in the middle line, only a very small portion of the right lobe having been divided. In this case, the vertical extent of the gland corresponds to the first four dorsal vertebral bodies and to the disc between the fourth and fifth vertebrae. Anteriorly, it is related to the first and second part of the sternum in the middle line, but laterally as will be seen in the other sections, it descends to a lower level. It is loosely attached to the posterior surface of the sternum. Posteriorly, it is related to the pericardial sac, the left innominate vein, and the commencement of the aortic arch. It extends up in the root of neck till it comes almost into apposition with the thyroid isthmus. It measures nearly two dishes in its vertical extent in the middle line, and has a greynish pink colour and a lobulated appearance, very accurately represented in this drawing. (PI)
The Heart

The heart, with its great vessels, is seen in this section to occupy nearly the whole thoracic cavity in the ventral plane of the body. The section in this region is very nearly quite muscle, and we find that it has opened into the right and left auricles into the anterior part of the right ventricle into the commencement of the aorta and into the pericardial sac.

The heart is seen lying in the pericardial sac, being in contact with its visceral surface. It rests inferiorly upon the central tendon of the diaphragm which is perforated to allow of the passage of the vena cava inferior from the abdomen to the right cardiac auricle. Anteriorly the heart is related by means of the pericardium with the second, third, and fourth spaces of the meso-sternum, whilst superficially lies the thymus gland separating it from the sternum. Posteriorly the heart corresponds in vertical extent with the
1st, 2nd, 3rd, 4th, and the upper part of the 5th dorsal vertebrae, being separated from them by the trachea above and by the pericardial sac and oesophagus below. It is to be noted that no lung tissue is to be seen in this section, but even anterior to the heart where it thin layer is sometimes present in the child (vide Plate II in Lempereur Atlas). The lungs were not expanded. The heart measures in vertical extent in this section 3 cm (a little over 1 inch), whilst the greatest antero-posterior measurement is 1.2 cm (about 1/2 inch). The thickness of the walls will be noted in connection with Plates II and III.

The right auricle, which was found to contain a mass of blood clot, is seen to communicate with the right ventricle by means of the tricuspid valve, and part of the patent foramen ovale is seen forming a communication with the left auricle. Inferiorly the vena cava inferior is seen opening into the right
auricle. The Eustachian Valve lies below the foramen ovale. The opening of the superior vena cava is not seen in this section.

The right ventricle is only opened into towards the apex of the heart and will be considered more in detail in Plate II; but the tricuspid valve is well displaced in this section.

The left auricle is seen in this Plate lying posteriorly and having a somewhat quadrilateral shape. The section has passed through the patent foramen ovale which pierces the auricular septum and forms a communication between the right and left auricles.

The left auricle is seen to correspond to the 5th, 6th, and 7th dorsal vertebrae postero-irally. Part of the auricular appendix is seen lying in front of the beginning of the arch of the aorta.

The left ventricle is not opened into at all in this section, but the origin of the aorta from this ventricle is to be noted.
The Great Vessels

The aorta is seen arising from the left ventricle at the level of the 5th dorsal vertebra behind and of the second part of the mesosternum in front. It passes upwards, backwards and at first slightly to the right and at the level of the second dorsal vertebra can be seen becoming continuous with the transverse part of the aortic arch. If there gives off the innominate artery which in this section has been slightly opened into as can be seen in Plate II. The ascending part of the aortic arch is thus seen to lie in front of the right pulmonary artery and commencement of the right bronchus. A little dissection reveals the fact that in front it is in contact with the pulmonary artery then with the thymus gland, and superiorly with the left innominate vein at the point where that vein joins the one of the same name from the right side to form the superior vena cava.
The pericardial sac is seen surrounding the heart and sending a prolongation forming a sheath for the aorta. It is seen to have a somewhat conical shape, its base resting upon the diaphragm, where the inferior vena cava passes through it to pour its blood into the right auricle.

The trachea has already been considered in the description of the region of the neck; we need only note that it bifurcates at the level of the fourth dorsal vertebra at which point the right bronchus is seen crossing towards the right side along with the right pulmonary artery.

The esophagus

The esophagus can be seen in this section to leave the middle line at the level of the 6th cervical vertebra. At this point it arches to the left side, but it again returns to the middle line at the level of the 6th dorsal vertebra, again to
pass to the left side at the level of the body of the 9th dorsal vertebra. It is usually related to return to the middle line at the level of the lower border of the 3rd dorsal vertebra and to continue in the middle line down to the disc between the 9th and 10th dorsal vertebrae, but the difference in the levels in this case may be due to the fact that the section is here very slightly to the left side of the middle line. It measures in vertical extent 1.5 cm (nearly 0.6 inches), and dissection reveals the fact that at the level of the lower part of the body of the 9th dorsal vertebra it pierced the diaphragm to open into the cardiac end of the stomach. It is seen at first to lie in front of the spinal column, and is then found to lie anteriorly to the aorta, interiorly to it lie the trachea and lower down the pericardium. The lungs are not visible in this section (vide Plate II, III, etc).
The Region of the Abdomen

In this region the section has followed pretty closely the middle line, leaving it, however, at its lower part to incline to the right side. The abdomen is seen to measure 12 cm in vertical extent, whilst antero-posteriorly it measures at the level of the 1st dorsal vertebra 9.2 cm (3½ in.) and at the level of the umbilicus 7.4 cm (2¾ in.). It is therefore probably somewhat compressed from before backwards. We have to consider its walls and its contents, the latter consisting of liver, pancreas, large and small intestine, omentum, blood vessels and bladder.

The Abdominal Walls

The anterior abdominal wall made up of muscles, fat and skin is seen freeing upwards from the pelvic bone to the sternum and measures some 15 cm in extent whilst its thickness varies from 1 cm to 2 cm. The umbilicus is situated at a point
opposite to the disc between the bodies of the 4th and 5th lumbar vertebrae, and at this
point the umbilical cord can be seen to become continuous with the abdominal
wall. A little dissection reveals the umbilical vein passing upwards towards the
liver.

The posterior abdominal wall is made up of the four lower dorsal vertebrae and
of the lumbar vertebrae. This has been already considered (vide, The Spine).

The Abdomen is seen to be bounded above by the arch of the diaphragm. The ante-
rior attachment of the diaphragm to the ensi-
form cartilage is seen, whilst posteriorly
we can trace the attachment of the left
crus to the vertebral column. The
central tendon is seen to be at the level
of the 8th dorsal vertebra, the anterior attach-
ment at the level of the 9th dorsal vertebra
and the right crus is seen to pass down-
wards upon the bodies of the 10th, 11th, and
12th dorsal, and 1st lumbar vertebra to end.
in its tendon attached to the 1st and 2nd lumbar vertebra. On the inner side of the left crus is seen the costa passing upwards close to the vertebral bodies. The inferior vena cava is seen to pass through the dia-
phragm 1.5 cm in front of the spinal col-
umn. The opening for the oesophagus is not seen in this section.

Superiorly the abdominal is seen to become continuous with the pelvic cavity, the line of demarcation being one drawn from the promontory of the sacrum to the symphysis pubis.

**The Liver.**

In this section the liver is seen to be divided a fraction of an inch to the right of the suspensory ligament attachment and entrance of the umbilical vein. Anteriorly, therefore, the right lobe is seen and posteriorly and superiorly we note the Spigelian lobe, whilst lower down is the Lobus quadratus.
The colour of the liver in this Plate is a faithful representation of that which was seen immediately after the section had been made.

The greatest vertical measurement of the liver in this section is 5.6 cm (2 3/4 inch), a distance corresponding to the disc between the 8th and 9th dorsal vertebrae, to the 10th, 11th, and 12th dorsal and to the 1st lumbar and part of the 2nd lumbar vertebrae.

The greatest antero-posterior measurement (at the level of the 11th dorsal vertebra) is 4.5 cm (1 3/4 in).

The lobus Spigelii is seen to correspond to the disc between the 9th and 10th dorsal vertebrae and the 10th, 11th, and upper part of the body of the 12th dorsal vertebrae. Since this lobe has been separated from its attachments by the section it lies loosely.

The longitudinal fissure of the liver has been cut into, its anterior part containing the umbilical vein and named the umbilical fissure is not displayed as its
entire extent, but its posterior part, the fissure of the ductus venosus is fully seen. The ductus venosus and also the hepatic vein from the left lobe are seen entering the inferior vena cava at the point where it pierces the tendon of the diaphragm to open into the right auricle. A little dissection revealed the presence of the broad, falciform or epiploic ligament, connecting together the under surface of the diaphragm and the upper convex surface of the liver and forming the line of demarcation between the right and left hepatic lobes. It consists of two folds of peritoneum forming a covering for the umbilical vein and can be traced downwards in relation to the rectus muscle to the umbilicus. The umbilical vein leaves the ligament to enter the longitudinal fissure of the liver. The other parts of the liver will be described in Plates II, III, etc.
The Pancreas.

This organ is seen in this section lying between the 1st and 3rd parts of the duodenum. The first part of the duodenum is seen to lie anterior and superior to the pancreas whilst the third part lies posteriorly and inferiorly. The pancreas lies opposite to the bodies of the 1st and 2nd lumbar vertebral bodies, near the left renal vein crossing immediately behind it, and has running in its substance the superior mesenteric vein and artery. It is seen from this drawing to have a pale pinkish white colour and to have outlines by no means clearly marked out. The part seen in this section is the head just where it becomes continuous with the body of the gland. Below the gland and anteriorly to it lies the transverse colon of the large intestine. The pancreas is seen in its further relations in Plate X I.
The Intestines.

The Duodenum. The Stomach is not seen in this section but its pyloric end has been divided at the point where it becomes continuous with the first part of the duodenum. The first part of the duodenum is thus seen to lie immediately opposite to the body of the first lumbar vertebra and to have its long axis directed transversely to the axis of the abdomen. It lies behind the quadratus lobe of the liver and in front of the pancreas, whilst inferiorly to it lies the transverse colon of the large intestine. The second part of the duodenum is not seen in this section but the third part is seen crossing the abdominal aorta at the level of the second lumbar vertebra. It lies behind and slightly below the pancreas and is directed towards the left side of the middle line. From this Plate and from Plate XI it is seen that the duodenum—
embraces the head of the pancreas. The first part of the duodenum is placed 2 cm in front of the vertebral column, the third part 4 mm anterior to the spine.

The rest of the small intestine, consisting of jejunum and ileum, is seen filling up the space between the various parts of the large intestine, and it is to be noted that it contains no meconium. We note also the mesentery stretching downwards inferiorly to the pancreas and lying in it are seen the cross sections of the mesenteric artery and vein.

The large intestine is also partly seen in this section. We find the transverse colon lying inferiorly to the pancreas and anteriorly and inferiorly to the pancreas and jejunum. In the section it is seen to make a sharp turn downwards and so is twice cut across. It is seen to be distended with green meconium and in front of it lies the great omentum, a structure
which is very thin and transparent in the newly born child (See Case B Plate I). The transverse colon is traced further at Plates II and III.

We have also to note in this Plate the cecum and commencement of the ascending colon. We note that it also has been twice divided on account of its shape. It can be further traced in other sections, side of the right side of the body, passing towards the right side. In this section the ileocecal valve can be seen in that part of the cecum which lies superiorly. In front of the cecum lie the bladder, and it must be remembered that at this point the section decreases very considerably. The right side of the middle line another part of the large intestine named a loop of the sigmoid flexure. It is shown in this section, but since it lies below the level of the brim it will be best considered when the pelvis and its contents are described.
The blood-vessels of the Abdomen
several of the blood-vessels of the abdomen
are seen in this section.
The abdominal aorta is opened into as it
passes upwards in the abdomen lying in
close apposition to the vertebral column and
to the middle line of the body. It has
been cut into for an extent corresponding
to the lower part of the 11th to the 12th dorsal
vertebra, to the 7th and 8th and to the disc
between the bodies of the 3rd and 4th lumbar
vertebrae. Its division into the right
and left common iliac arteries, which usually
takes place immediately opposite to the
middle of the 4th lumbar vertebra, is here
seen to occur opposite to the disc between
the third and fourth lumbar vertebrae.

The extent of aorta here opened into is 5 cm
or 9 inches. It is seen passing upwards
between the pillars of the diaphragm to
enter the thorax. In front of it we
note the pancreas, the left subclavian vein, 3rd
and the small intestines and mesentery.
The left common iliac vein is seen crossing the middle line at a point corresponding to the disc between the 4th and 5th lumbar vertebrae, it here joins the right common iliac vein to form the renal curve inferior which ascends lying to the right of the aorta, it is therefore not visible in this section.

The hepatic artery and portal vein are seen entering the liver at the tricuspid praeve, bind the superior mesenteric vein is seen emerging from behind the pancreas at the point where it joins the splenic vein to form the vena portae.

The superior mesenteric artery and vein are also seen as they lie in the mesentery and the left renal vein is seen crossing the middle line at a point opposite to the disc between the tips of the 1st and 2nd lumbar vertebrae. The left renal passes in front of the aorta to join the inferior vena cava. The blood vessels in the liver have been noted.
The Bladder

We shall here consider the bladder, for it seems to be here an abdominal organ. It is to be noted that if we draw a line from the promontory of the sacrum to the symphysis pubis the bladder lies entirely above this line. In this newly-born child, therefore, the bladder is seen the entirely an abdominal organ. In this section of the bladder, which is to the right of the median line, the shape of the vesica is seen to be roughly triangular. Its lining membrane is thrown into numerous mucous folds. The apex of the triangularly shaped bladder is directed upwards and from the apex the urachus runs upwards in the anterior abdominal wall towards the umbilicus. It is to be noted that the anterior surface of the bladder, triangular in shape with its base at the pubis, is in immediate contact with the anterior abdominal wall, no peritoneum
intervening. The vesical orifice of the bladder is at the level of the upper border of the symphyseal pubis. In vertical extent the bladder measures 2.8 cm (⅞ in.) and corresponds in level to the 1st and 2nd sacral vertebrae.

The form which the bladder has in this position is that which has been termed the cylindric in order to distinguish it from the other form which it has when in diastole which is oval. There was no urine in the bladder in this case, but in the case of the hydrocele poison as will be seen the bladder contained wine and had then a totally different appearance.
The Region of the Pelvis

In the region of the pelvis the section deviates very considerably to the right of the median line of the body and we therefore find the sacrum and the pubic bone cut obliquely while neither the rectum nor the prostate gland are seen.

A remarkable point brought out by this section is that a coil of large intestine is seen forming one of the pelvic contents. This part of the large intestine was found on dissection to be a loop of sigmoid flexure continuous with the rectum and distended with meconium. Considerable dissection was required to bring out the relations of the parts to each other, and it was then found that the bony pelvis had been divided obliquely. Above, the section passes obliquely through the right side of the body of the first piece of the sacrum, then passing more to the right...
it passes through the lateral portion of the second and third pieces of the sacrum. At this point the oscaus continuity is lost, but lower down we find that the section has passed through the rami of the ischium a little in front of the ischial tuberosity. Anteriorly the os. pubis has been cut through in its superior or ascending rami about half an inch to the right of the symphysis. He finds therefore between the two last-named bones, points the obturator membrane with on its outer aspect the obturator externus muscle and on its inner the obturator internus muscular origin.

The conjugate area of anterior posterior diameter of the pelvis in this specimen measured 8.32 cm (1 1/4 inches)
The penis and scrotum are divided along the right of the median plane. The penis indeed has scarcely been cut into at all. We can note very clearly the prepuce and the gland penis with the opening of the urethra. The right half of the scrotum has been laid open and we see lying in it the right testicle with its epididymis (globus major and globus minor), and also the structure known as the processus vaginalis peritoneae which is the pouch of peritoneum which has passed from the abdominal cavity into the scrotum. The testicle is attached to this process by means of a structure known as the mesorchium.
Plates II & III  Case A

We shall describe Plates II and III together for they represent the two aspects of the second vertical sagittal section which was made in Case A. This section was made at a point nearly 3/4 inch to the left side of that represented in Plate I, and is, therefore, in the great part of its extent a representation of the parts lying 3/4 inch to the left side of the sagittal plane of the body in the infant. But, on account of the peculiar position of the head, the cerebrum has been divided very nearly medially, and in the pelvic region the parts have been divided only a fraction of an inch to the left side of the middle line so that in this last named part we find that the tectum has just escaped being opened into whilst the occiput is seen in the greater part of its extent in the region of the face, neck,
Thorax, and abdomen, however, this drawing may be said to represent the structures lying ¾ inch to the left side of the middle line of the body. The whole section measures 38 cm. by 15 inches vertically; it has at the level of the eye an antero-posterior measurement of 11.5 cm. (4½ in.); at the level of the first rib an antero-posterior diameter of 6½ cm (2½ in.); at the level of the 4th rib 9 cm (3½ in.); at that of the central tendon of the diaphragm the same measurement; at that of the lower margin of the liver 6¾ cm (2½ in.); at that of the umbilicus 6½ cm (2¾ in.); and at that of the promontory of the sacrum 8½ cm (3½ in.).

We shall pursue the same method of description as that adopted with Plate I, taking up in order the regions of the head (cranium and face), the neck, thorax, abdomen, and pelvis; but we shall not enter so fully into details.
The region of the Head

The Cranium and Cerebrum

The bones which go to form the vault of the skull have in these two plates been divided very nearly in the sagittal plane, the section having passed very nearly through the sagittal suture. We find therefore that the anterior and posterior fontanelles are well seen, the anterior measuring 3.9 cm (1½ in.) in length, whilst in the case of the posterior the dipping of the top of the occiput below the contiguous margin of the parietal is to be noted. The bones are seen to have a mean thickness of 2mm. It is to be noted that the base-occiput is separated from the supra-occipital by cartilage.

Anteriorly the cerebrum has been divided slightly to the left of the median line, but further back the section passes in the middle line dividing the corpus...
callosum in its posterior portion, and exposing the convolutions of the median or internal surface of the cerebrum. Posteriorly we find the parieto-occipital fissure dividing the cuneate from the quadratit lobe, and it is to be noted that this fissure closely underlies the posterior fontanelle. In the cuneate lobe we note the calcarine fissure commencing in a bifurcated manner posteriorly and turning forwards towards the posterior part of the corpus callosum. Below the cuneate lobe is seen the tentorium cerebelli and part of the straight sinus. We find the marginal convolution running forwards from the anterior end of the caudate lobe and underlying the anterior part of the parietal bone, the anterior fontanelle and the frontal bone. Above the corpus callosum a part of the gyrus fornix is seen, lying in the left lateral portion of the mid-dle fossa of the skull is the anterior
portion of the left temporo-sphenoidal lobe and here also is seen in section the cavernous sinus in the posteric
process of the skull is found the cerebellum in the two last-named from the section is about 1/8 inch to the left
side of the middle line, therefore it follows that we do not find in these two plates the structures at the base of the brain
such as Pons Varolii, Medulla oblongata etc. By raising the left temporo-sphenoidal lobe the whole of the left cavernous sinus
is displayed and it is seen to contain a large quantity of blood clot, owing to the oblique character of the section
the lateral cerebral ventricles on the left side has been partly opened into, but none of the other ventricles are shown
in these plates. The left lobe of the cerebellum is seen resting upon the
baso-occiput and upon the petrous portion of the temporal bone. Its
structure is not very clearly seen.
The Region of the Head (continued)

The Face.

In these two sect plates the face is seen divided very nearly in the vertical median plane of the left eye-ball.

Let us look, first, at the orbital cavity and the eye. The upper wall of the orbit is seen to be made up of the orbital plate of the frontal bone and the small wing of the sphenoid, whilst its floor is divided at the point where the malar bone joins the malar process of the superior maxillary bone.

Posteriorly we find the great wing of the sphenoid, between it and the lesser wing is the sphenoidal fissure which gives passage to the ophthalmic vein, the 3rd, 4th, and 6th nerves and the ophthalmic branch of the 5th cranial nerve.

The opic foramen lying in a plane nearer to the middle line and giving passage to the opic nerve is not seen in either Plate II or III.

At the lower part of the posterior wall is seen the sphenomaxillary fissure, leading from the orbit into the zygomatic fossa and giving
passage to the infra-orbital artery and the superior maxillary nerve. The inner wall of the orbit was revealed by raising the eye-ball and making a little dissection, it was then seen to be made up of the nasal process of the superior maxillary bone, the lacrimal bone, part of the ethmoid, and part of the body of the sphenoid bone. A little dissection would also the outer wall made up of the orbital plate of the great wing of the sphenoid, and the sphenoid bone. Anteriorly the orbit is closed in only by the upper and lower eyelids.

One or two of the muscles of the eyeball are seen in these plates, thus we see above the eye the levator palpebrae superioris running forwards to be inserted into the tarsal cartilage of the upper eyelid. Beneath the levator is the superior rectus muscle of the eyeball, arising near the optic foramen and passing deep into the sclerotic coat of the eye-ball on its superior aspect. Posteriorly we see the external rectus divided near its origin from the margin
of the optic foramen and from the lower margin of the sphenoidal sinus. The other muscles of the eye-ball were only seen after some little dissection had been made.

The eyeball is seen lying upon the cushion of fat which fills up the posterior part of the orbit, whilst anteriorly it is covered by the upper and lower eyelids. On raising the outer part of the eyeball, the lacrimal gland placed in the outer and upper part of the orbital cavity is seen. The upper and lower eyelids are separated from each other by the fissura palpebralis, and the eyelashes are very small, fine, and few in number.

The eyeball measures 1.6 cm in its greatest vertical diameter and 1.8 cm antero-posteriorly.

We can see the capsule of Tenon, the cornea anteriorly and the sclerotic coat posteriorly, the anterior chamber and aqueous humour, the crystalline lens measuring 6 mm in vertical extent, and the posterior chamber with vitreous humour, choroid and retina. The optic nerve enters the eyeball on a plane a little nearer to the middle line of the body.
We have now to note in the region of the cheek a large amount of adipose tissue, but there is also a distinctly lobulated mass of fat to which the name of 'sucking pad' has been given. This sucking pad is well displayed in both Plate II and III, it is especially developed in the infant, and its supposed function is to prevent the buccinator muscle being driven forwards between the upper and lower jaws during the act of suction. It lies therefore, upon the buccinator muscle in the space between the lower margin of the malar bone and the upper surface of the lower jaw in front of the angle; it may also extend backwards upon the surface of the masseter muscle for a slight extent. The section passes through the inferior mandibular bone in front of the masseter, indeed in Plate III part of the masseter has been divided. The facial artery and vein are seen emerging from under shelter of lower jaw in Plate II and they are again seen in their terminal branches in front of the malar bone.
In the section of the lower jaw the germ of one of the molar teeth is seen in its cavity. Running backwards from the posterior wall of the orbit is seen the greater wing of the sphenoid bone, this along with the petrous portion of the temporal bone go to form the floor of the middle fossa of the skull. Between these two bones is seen (P. 15) the foramen lacerum medium, blocked up with fibro-cartilage. It is at this point that we trace two tubes running backward to the tympanic cavity, the upper of the two is for the tensor tympani, the lower and one is for the Eustachian tube. They both enter the temporal bone at the angle of junction of the squamous and petrosus portions. The section also passes through the semicircular canals in the petrous portion of the temporal bone.

Still further back we note the foramen lacerum perforating between the petrous part of the temporal and the occipital bone, transmitting the blood from the lateral sinuses into the internal jugular
vein and also giving passage to the three divisions of the 8th nerve. Some dissection was necessary to reveal the relation of the structures in the foramen lacerum posterior or jugular foramen. It was then seen that in the posterior compartment of this foramen lies the commencement of the internal jugular vein, the vessel which conveys the venous blood from the lateral sinus to the unci-nate vein. In the middle compartment of the jugular foramen were found the three divisions of the 8th nerve, the glossopharyngeal lying anteriorly, the pneumogastric or vagus posteriorly, and the spinal accessory nerve behind the vagus and enclosed in the same sheath of dura-mater with it. In the posterior compartment of the jugular foramen we find the inferior petrosal sinuses leaving the interior of the skull to join the commencement of the internal jugular vein.
The Region of the Neck.

In Plates II and III we find represented the muscles and vessels of the neck. We have to note the trapezius muscle, the oculi lateralis superior passing to be inserted into the 2nd, 3rd, 4th and 5th ribs, the splenius capitis and colli, the cervicis ascendens, transversus cervicis, and the cervical part of the trachea mastoide, and the large compellatus muscle lying very deeply we find the semispinalis colli and the multi-fidus spinac, but these last mentioned muscles lie in a plane nearer the middle line and are therefore not seen in these two plates.

In Plate II we can trace the internal carotid artery as it passes upwards from the bifurcation of the coecum carotic to pass through the carotid canal of the petrosus portion of the temporal bone and so to gain the
interior of the cranium. The common carotid artery is not seen in either Plate II or III for it lies in a plane nearer the middle line and is concealed from view by the internal jugular vein. From a consideration of the two plates we are able to trace the internal jugular vein in the whole of its course from the jugular foramen to the point behind the clavicle where it joins the subclavian vein to form the left innominate vein. In the upper part of its course the internal jugular vein is seen in Plate III, whilst its lower part is displayed in Plate II. It is seen to pass almost vertically from the jugular foramen to the root of the neck. It is true that in its lower part it has a distinct curve with a concavity forwards, but we must remember that in this case the head is markedly flexed. In its course the internal jugular lies
behind the internal carotid artery at the base of the skull, it then lies external to the artery as far as the point of bifurcation of the common carotid, and in its rest of its course it lies to the outer side of the common carotid artery. In these two plates we find therefore that both the common and the internal carotid arteries are concealed by the internal jugular vein. A little dissection reveals the fact that the above mentioned vein is lying in a sheath of fascia which is common to it, to the common and internal carotid arteries, and to the pneumogastric nerve. On raising the internal jugular vein we can trace the internal and common carotid arteries lying internal to it, the vagus nerve lying in an intermediate position and in a plane posterior to both vein and arteries. At the root of the neck the vagus was traced facing
downwards between the left common carotid and the left subclavian artery and lying behind the left unicom-
inate vein.

Lying posteriorly to the internal jugular vein in the upper part of its course we note (in Plate II) the condyle of the scapula resting upon the cup of the left superior articulare process of the atlas vertebra. The cartilage in this joint is well seen. In Plate III we see in this position a view passing towards the posterior condyloid foramen and through it enterically the cranialis to pour its blood into the lateral sinus.

At the root of the neck in Plate II we have to note immediately behind the clavicle at its junction with the sternum a vein passing to join the internal jugular vein. This is the anterior jugular vein. Situated also behind the clavicle but at a lower level is seen the subclavian vein divided
at a point immediately external to its junction with the internal jugular to form the innominate vein of the left side. Lying anteriorly to the subclavian vein is the external jugular which joins it. Lying on a plane posterior to all these veins is the subclavian artery of the left side divided at the point where it turns outwards to pass into the axilla as the axillary arches.

In Plate III we note also the subclavian artery and vein and the external jugular vein. The scalenus anticus muscle is seen lying between the veins above mentioned and the subclavian artery.
The Region of the Thorax.

In Plates II and III we have to study in the region of the thorax, the chest walls, the heart and pericardium, the left lung and pleura, and the thymus gland.

The walls of the thoracic cavity, the posterior wall is seen to be composed of the twelve ribs which are seen in section and of the muscles proper to them and to the dorsal region of the vertebral column. Internally we find that the chest wall is made up of the thick layer of adipose tissue, the pectoral and major and minor muscles, the clavicle cut across near its junction with the manubrium sterni; and the first seven costal cartilages divided also near to their junction with the sternum. At this level the heart is seen to correspond
to the 3rd, 4th, 5th, and 6th costal cartilages, the apex lying opposite to the sixth costal cartilage. The thymus gland lies posteriorly to the first and second costal cartilages. It descends nearly to the level of the 3rd costal cartilage and ascends into the root of the neck to a point opposite to the posterior extremity of the first rib. It has roughly speaking the form of a triangle with a long superior side which runs downwards and forwards, a shorter inferior side which runs almost directly forwards, whilst the posterior side which is the shortest of the three runs vertically downwards with a slight inclination forwards. It is kept to rest upon the upper lobe of the left lung. Posteriorly, to be in contact with the left auricular
appendix and right ventricle inferiorly, whilst its antero-superior side bridges across the superior aperture of the thorax and is in contact with the 1st and 2nd costal cartilages and the first and second intercostal spaces on the left side. The thymic gland measures from its poster-superior angle to its antero-inferior angle 5 cm.; and from its poster-superior to its poster-inferior 3 cm. 2.6 cm. The pinkish white colour of the gland is well seen in these two plates. In these plates also we see the right and left cardiac ventricles and also a part of the left auricular appendage. We note the ventricular septum dividing the right ventricle, which lies anteriorly, from the left ventricle which is situated posteriorly, and we observe the thicker muscular wall of the latter chamber.
In the right ventricle are seen two openings, one the tricuspid leading into the right auricle, the other situated superiorly leading into the pulmonary artery. The pulmonary artery is seen to spring from that part of the ventricle known as the conus arteriosus. The columnae carneae are seen in the interior of the ventricle. This part of the heart is seen to correspond with the 3rd, 4th, 5th, and 6th costal cartilages. The pulmonary artery arises at a point opposite to the 2nd intercostal space. The tricuspid opening is seen to correspond to the 4th intercostal space at the left border of the sternum.

The left ventricle is seen to have a larger cavity and thicker muscular walls, lying posteriorly and it corresponds to the same costal cartilages anteriorly as does the right ventricle. In addition are two openings, the mitral or
Six leading into the left auricle and above it the opening of the aorta guarded by the aortic sigmoid valves. In its interior also we note the columnae carneae and in Plate II more especially, we see which form which are the cross sections of the mucous papillae. The auricle ventricular and the aortic openings are at the level of the 3rd intercostal space and of the 2nd costal cartilage respectively. The aortic lies posteriorly to the pulmonary一心一意 superiorly and posteriorly at the level of the second left intercostal space near the sternum is seen part of the left auricular appendix. The heart at the level of the 3rd costal cartilage measures 3.2 cm in an antero-posterior direction, whilst at the level of the 5th costal cartilage its antero-posterior measurement is 4.3 cm. Its vertical measurement is 3 cm. The pericardial sac has its walls in apposition.
We find the left lung lying posteriorly to the heart, and we can see its division into two lobes, an upper smaller one and a lower larger one. The root of the lung lying as it does nearer to the mediastinum is not seen in this section. Pulmonary arteries, veins, and bronchi are well in section in various parts of the lung. The whole lung, as seen in these sections, has a quadrilateral shape, with an upper, a lower, an anterior, and a posterior margin or border. The upper margin had a slight concavity forwards and is in relation to the thymus gland, and its upper angle lies opposite to the second rib divided close to its angle. This border measures 2.5 cm. The anterior border runs nearly vertically downwards with a very slight concavity forwards, in contact with the posterior wall of the left ventricle and with the left auricular appendix and measures 3.5 cm.
The inferior border runs downwards and backwards, is in contact with the diaphragm and measures 2.5 cm. The posterior border is the longest, measuring as it does 4.4 cm, runs downwards vertically with a slight backward convexity and is in contact with the posterior wall of the chest, the pleura alone intervening. The posterior border extends from a point corresponding in this section to the 2nd rib to a point midway between the 10th and 11th ribs. The division between the upper and lower lobe begins posteriorly at a point corresponding to the 5th rib and runs forwards and slightly downwards. The lung as seen in this section measures 4.1 cm vertically, and 1.8 cm. in an antero-posterior direction at the level of the 6th rib.

The thoracic cavity at the level of the diaphragm measures 25 cm antero-
posterior direction 6.1 cm (2³/₂ in.) and at the level of the 2nd rib 4 cm (1¾ in.).
while vertically from clavicle to diaphragm it measures 5.6 cm and from first rib posteriorly to lowest point in plural cavity 7.6 cm. (3¼ in.).
The measurements of the auricular ventricular walls were as follow:
the left ventricle had a wall with a thickness of 6 mm.; the right ventricular wall measured 2 mm in thickness; whilst the interventricular septum measured 4 mm.
The important points to be noted in the thorax are firstly the large size of the thymus gland, and secondly the position and size of the left lung. The size of the thymus gland and its position in the upper part of the thorax must be borne in mind when we percuse or auscultate the chest in the newly born infant.
The Region of the Abdomen.

In these two plates the relations of the abdominal contents which lie to the left of the middle line are seen. We have to note the left lobe of the liver, the stomach, the large and small intestine, part of the spleen, the left kidney with its suprarenal capsule, the psoas muscle and certain bloodvessels.

The abdominal cavity in this section measures vertically 7 cm (3 1/2 in.), whilst in an antero-posterior direction it measures at the level of the liver 5.5 cm (2 1/4 in.), and at the level of the psoas muscle only 2.5 cm (1 in.).

In front we note the anterior abdominal wall cut in section, we note the comparatively small amount of adipose tissue, and the divided rectus abdominis muscle.

Posteriorly we note the muscles of the lumbar region, and the thick layer
of adipose tissue lying superficial to them. We also see the divided 11th and
10th ribs, the former lying posterior to
the suprarenal capsule, the latter
lying behind the upper part of the
kidney. In front of these tworibs
we note the origin of the psoas
magnus and pectoris muscles, and
downward at the pelvic inlet we
see thick, fleshy belly of this mus-
cle.
The central tendon of the diaphragm is
seen lying superior to the stomach,
epitelium, and left lobe of the liver,
descending to a lower level behind
than in front, and forming the
roof of the abdominal cavity.
The left lobe of the liver as seen in
tissue plates is seen to be nearly
triangular in shape and has a
superior, an anterior, and an
inferior surface. The superior margin
is seen to be moulded to the
diaphragm and is slightly convex, whilst the anterior surface runs vertically downwards with a slight inclination backwards and is in contact with the upper part of the anterior abdominal wall. The left border which we may call posterior-inferior is sinuous and runs downwards and forwards, being in contact in the greatest part of its extent with the stomach, its lower extremity only being in contact with the transverse colon of the large intestine. The greatest antero-posterior diameter of the left lobe in these plates is 5 cm (2 inches) and its greatest vertical diameter is 4.5 cm (1 3/4 in).

Further view of the stomach is obtained in Plate III than in Plate II for in the latter plate the small curvature of the viscous has come into the line of section and hence the cardiac...
end appears to be separate from the pyloric extremity. In Plate III the cavity of the stomach is seen to be continuous from oesophageal to pyloric end. The stomach has its long axis directed downwards and backwards and is seen in these sections to be in contact anteriorly in the whole of its extent with the posterior surface of the left lobe of the liver. It measures in its long axis 5 cm (2¼ in.), and its width is 1 cm at some points and a little less at others. The communication with the oesophagus is not displayed, but we can see very well the commencement of the pylorus which passes towards the right side at the level of the 1st lumbar vertebra. The stomach contained only a little frothy mucus. Posteriorly the stomach is seen to be in contact
with the spleen superiorly, then with
the suprarenal capsule, then with
the small intestine, and finally
its pyloric end is seen to touch
the transverse colon. Attached
to the lower border of the stomach
and passing down in front of the
transverse colon is the great mes-
tun which is quite thin and
transparent in the child.
Lying posterior to the cardiac end of
the stomach is seen a small part of
the spleen, triangular in form, and
wedged in as it were, between stom-
ach lower surface of diaphragm and
suprarenal capsule. The part of the
spleen here seen is the upper extrem-
ity, and it will be noted that it
corresponds in level to the 9th and
10th ribs and to the space between
the 10th and 11th ribs. It is of a
reddish brown colour, darker than
that of the liver; it measures
nearly 2 cm. from above downwards and forwards as seen on Plate III and a little less than this is in Plate II.

A small thin portion of the tail of the pancreas is seen at a lower level than the spleen lying between the posterior surface of the stomach and the anterior surface of the left supra renal capsule.

The left supra renal capsule, of large size as it always is in the newly born child, is well seen in these two plates, and it is at once evident why its form has been compared to that of a cocked hat. It covers the upper end of the kidney, passing downwards also on its anterior surface as far as the hilum of the organ. It is seen (Plate II) to have a lighter coloured cortical portion and a darker medullary part. Its general colour is lighter than that
of spleen, liver or kidney. The left suprarenal capsule has an anterior superior border which is in contact with the posterior surface of the spleen, the posterior surface of the stomach, with the pancreas and with the small intestine. The posterior border of the suprarenal capsule is in contact with the origin of the psoas muscle, whilst the lower margin directed downwards and forwards rests upon the upper end and anterior surface of the left kidney.

The left kidney is well seen in these plates, especially so in Plate III, in which we note the lobulated character of the organ seen in the infant. It is divided vertically, and is seen to have a larger upper and a smaller lower extremity, between the two is to be noted the hilum of the organ with artery, vein, and ureter. The
upper end of the kidney is slightly nearer the middle line of the body than the lower and hence in Plate II more of the upper than of the lower extremity is seen in section. The kidney is seen to measure 3.2 cm in vertical extent and 1.5 cm in an anterior-posterior direction. It lies opposite the 12th rib extending 5 mm above it and 2.4 cm below its level. The kidney further is seen to be surrounded by loose fatty tissue (the tunica adiposa). Posteriorly the kidney rests upon the psoas and quadratus lumborum muscles, superiorly it is capped by the supra-renal capsule which also descends for 1.5 cm on its anterior surface, lower down it is related anteriorly to the small intestines. Its relations with the descending colon are not seen in these sections. Its cortical and medullary portions can be seen in these plates.
The transverse colon of the large intestine is seen lying anteriorly in the abdomen immediately below the inferior border of the liver. It is seen to be distended with meconium. Behind it and below it lie the anils of the small intestine, whilst above it is the pyloric end of the stomach. Lower down in the abdomen just above the pelvic inlet is seen the commencement of the coccyx and on removing the meconium which it is filled the ileo-cecal valve was brought into view lying posteriorly above the artery of the left renal vein and below it are seen the divided iliac vein and artery of the left side, the vein lying superior to the artery. The bladder is not seen in these two plates.
The Region of the Pelvis.

The pelvis in three sections is divided anteriorly and to the left of the middle, but from the oblique direction of the section in this region we see find the parts divided in a plane nearer the middle line than in the regions of the thorax or abdomen. The sacrum is divided behind, and we have to note the sacral canals and surrounding cartilage, but the coccyx is not seen lying, as it does, nearer the middle line. Anteriorly we note the pubic bone divided at the level of the symphysis or obturator foramen, both the superior or ascending ramius and the superior or descending ramius of this bone are, therefore, seen in section. The section passes a little to the left of the inner portion of the acetabulum and the
arms, and we can see in Plate II the muscular wall of the third part of the rectum. It will be noted that the cavity of the pelvis has not been cut into. The adipose tissue in front of the pubic bone and in the rectus rectal fossa is well seen. In Plate III the seminal vesica in the region of the suberority has been divided. Part of the left testicle and the espermatic cord extending upwards from it are to be noticed in Plate II.
Plates IV and V. Case A.

We now proceed to describe the transverse sections of the right half of the body which were made in Case A. Plates IV and V are representations of the two surfaces, upper and lower, of the section made at the level of the eye and ear on the right side of the head. The line of section passed very nearly through the middle of the eye, being about 1/3 inch above the fissura palpebralis. If we trace the section backwards in the middle line we find that it passes through the ethmoidal plate, through the basisphenoid, the medulla oblongata, and through the basis-occiput and muscles lying posterior to it. In order properly to understand why these structures are met with we must remember that the head was flexed upon the chest during the freezing process. Posteriorly the line of section is...
1 inch above the level of the posterior part of the ring of the atlas vertebra laterally the section passes through the lower part of the right excretory auditory meatus just above the lobule of the ear.

The antero-posterior diameter of the section in the middle line is 4½ inches or 10.6 cm.

Fig. 2

From the above drawing (Fig. 2) an idea is obtained of the direction in which runs the section we are now describing.

We shall enumerate the structures seen in these plates, passing from before backwards.
Anteriorly in the middle line we find the thin nasal bone divided and represented in the Plate (X) by a small bony point. Immediately behind this lies the nasal septum of the frontal bone and externally to it is the nasal process of the superior maxilla divided just below its junction with the frontal bone at its internal angular process. Behind this again and still in the middle line is the perpendicular cartilaginous plate of the ethmoid and at its right side the right lateral mass of the ethmoid and its right os planum which last named portion goes to form the internal wall of the orbit. Lying behind the ethmoid bone is the half sphenoid, and at its right side is the great wing of the sphenoid divided just above the level of the optic foramen and forming the posterior wall of the orbit.
In the outer wall of the orbital cavity we have to note the malar bone divided at a level below its junction with the external angular process of the frontal bone. Lying posteriorly to the malar bone is the zygomatic bone.

We see, therefore, in this section the right eyeball lying in the right orbital cavity and divided a little above its neural transverse plane and on account of its place of division the crystalline lens is not visible. The eyeball measures 1.4 cm in its antero-posterior diameter while its transverse diameter also is 1.4 cm. Therefore, circular. The orbital cavity measures in an antero-posterior direction from the anterior surface of conjunctiva to the apex of the orbit 3.5 cm; whilst its transverse measurement from os planum of ethmoid to malar bone is 3 cm.
The vitreous humour and the sclerotic coat of the eye are well seen, but only the external angle of the fissura palpebralis is visible in this section, the remaining part of the fissure lying in an inferior plane. The adipose tissue in the back of the orbit, which forms a soft cushion upon which the eyeball rests is also well displayed, and we see, also, two of the straight muscles of the eye, the internal and the superior rectus arising from the bone round the optic fascia.

Passing backwards from the great wing of the sphenoid which forms the posterior boundary of the orbit is the squamous portion of the temporal bone with the projecting zygoma and lying in the temporal fossa thus formed is the temporal muscle. The middle fossa of the cranium bounded in front by the great wing of the sphenoid, externally
by the squamous portion of the temporal, posteriorly by the petrosal portion of the same bone, and internally by the basi-ethmoidal and basi-occipital is seen to contain the lower portion of the temporo-ethmoidal lobe of the brain. The condyle of the lower jaw is seen lying posteriorly to the temporal muscle and internal to the root of the zygoma of the temporal bone, whilst the position of the coronoid process which lies anteriorly and at a lower level is marked by a +.

(see Plate V).

Lying posteriorly to the middle fossa of the cranium we note the petrosal portion of the temporal bone divided below the level of both internal and external auditory meatuses. On passing a probe into the pharyngeal orifice of the Eustachian tube it was found to pass backwards slightly outwards, and a very little
downwards in relation to the horizon, upwards in relation to this section which is not parallel to the horizon.
downwards for a distance of 18 mm when it was seen to emerge in the interior of the tympanic cavity. So the inner side of the tympanic cavity is seen in section. The internal carotid artery as it emerges from the carotid canal in the temporal bone to pass forwards and upwards on the lateral aspect of the body of the sphenoid bone.

Dying posteriorly to the petrous portion of the temporal bone is the lateral mass of the occipital immediately above its right condyle, and lying anteriorly to this portion of the occiput is the lateral sinus and commencement of the right internal jugular vein.

Internal to the condyle of the occiput is seen part of the foramen magnum of that bone with the right half of the medulla oblongata resting in it.
lying behind the occipital bone are certain muscles which arise from that bone, as the rectus capitis posterior major and minor, the obliquus superior, the complexus etc.

Externally we note the ear, but unfortunately this section has passed a little below the level of the external auditory meatus. The hole of the external ear and the concha are seen as are also the tympanic cavity, floor and the opening of the Eustachian tube.
Plate VI. Case A.

This plate is a representation of a transverse section through the right side of the neck at the level of the cartilage between the 3rd and 4th cervical vertebrae. On account of the fixed position of the head of the child we find that anterily the section has passed through the upper lip and the tongue. Further the section inclines, in the region of the tongue, a little to the left side of the middle line, the + marking the position of the frenulum linguae.

The length of this section in an antero-posterior direction in the middle line is 10.5 cm. (1 1/8 inch).

In the middle line anteriorly we note first the skin and subcutaneous tissue of the upper lip and behind these structures the upper jaw divided at the level of the two central
incisor teeth which are seen lying in their alveoli.

Behind the upper jaw is seen the cavity of the mouth, and it is to be noted that this cavity is virtual not real, for the tongue is seen to be in contact with the walls of the buccal cavity.

The length of the tongue in the middle line is found to be 8 cm, whilst its transverse diameter varies from 15 mm posteriorly to 25 mm anteriorly. The transverse measurement given above is for the right half only, and granting the left half of the tongue to measure the same, we have a total transverse diameter of 30 mm (3 cm) posteriorly and of 22 mm anteriorly. Hence we find that the tongue tapers somewhat towards its anterior extremity, but not quite to the same extent as in the adult condition.
Posteriorly the root of the tongue is seen to be attached to the hyoid bone, and on lifting up the antero-lateral extremity we find the frenum linguae in the middle line (marked by + in Plate VI). Laterally we find the buccinator muscle and the inferior maxilla, which bone is divided immediately below its angle and in its section are revealed the alveoli of the molar and premolar teeth.

The tonsil of the right side is also seen at the side of the tongue but lying posteriorly to the divided hyoid bone. Externally to the buccinator muscle is seen the adipose tissue of the cheek, one part of which may be differentiated from the rest as the "sucking pad" or "cushion". The hyoid bone is situated behind the tongue and is 5.4 cm from the anterior extremity of this section and 6.4 cm from the posterior surface.
The parts of the hyoid bone here seen in section are the body, central piece or basi-hyal, and the commencement of the right great cornu or thyrohyal. We have to note the osseous centre in the middle line of the basi-hyal, this centre is said to appear in the last month of intra-uterine life. The rest of the hyoid bone seen in this section is seen to be cartilaginous. Immediately behind the hyoid bone is the upper aperture of the larynx. The epiglottis is at a higher level than this section, but we see cut across the thyroid cartilage. Behind the larynx is the pharynx with a cavity which in this position is virtual. Transversely the pharynx here measures nearly 2 cm, but its anterior and posterior walls are in contact. Behind the pharynx and separated
from its only by thin muscular tissue in the body of the 1st cervical vertebra
or rather the cartilage between this vertebra and the 2nd cervical.
Lying behind the body of the 4th cervical vertebra is the spinal canal
with in its interior the cervical portion of the spinal cord. Laterally
we find the transverse process and posteriorly the spinous process of
the 4th cervical vertebra.
Behind the vertebra are the muscles of the back of the neck, splenius
compleus and trapezius, and to the right side is the levator anguli
scapulae.
On the right side of the vertebra is the sternomastoïd muscle in action
and internal to it the internal jugular vein and the internal
carotid artery.
This Plate represents a section of the right side of the body made at the level of the upper part of the body of the 1st dorsal vertebra. It may be compared with Plate VII in Wright's Atlas and Plate V Fig. 1 in Symington's Work. Anteriorly in the middle line we find the sternum divided in the region of the manubrium and extending outward and backwards to the right side to the first part of the clavicle. The upper half of the clavicle bends upwards slightly and is not seen in this section. Behind the sternum is the upper part of the thymic gland, and behind the clavicular end of the clavicle is the innominate artery. The subclavian vein lies also behind the clavicle but more externally. Passing backwards in the middle line we find the trachea, and behind it the body
of the first dorsal vertebra. At the right side is the transverse process and we also note the head of the first rib attached to this vertebra. At the level of the body of the vertebra and a little in front of it we see the upper limit of the pleural cavity on the right side; a thin layer of pericard covers the apex of the right lung, but at one point this layer has been cut through and the apex of the lung can be seen. On the vertebral column we find the spinal cord and its membranes. Posteriorly we find the scapula divided in its upper part and the muscles covering it are also seen in section. The shoulder has been cut through just above the head of the humerus, the acromion process is seen in section.
Plate VIII. Case A.

This plate represents a transverse section of the right side of the body made at the level of the upper part of the body of the 5th dorsal vertebra. Anteriorly in the middle line is seen the body of the sternum, whilst behind it is the pericardial sac and in it the right auricle of the heart filled with blood clot, and behind it again lies the left auricle of the heart. Externally to the heart we note the right lung as it lies in the right pleural cavity, and at its root the right pulmonary artery, vein and bronchi. In the middle line we find the body, laminae, and part of the transverse process of the 5th dorsal vertebra and externally part of the 5th rib, and still further outwards the 6th rib. The arm is cut through showing the humerus and the scapula at the outer part of the shoulder joint.
Plate IX  Case A.

This section runs through the right half of the body at the level of the lower part of the body of the 7th dorsal vertebra. Anteriorly we find the right lobe of the liver seen in transverse section, lying behind the lower costal cartilage and being in contact all round with the diaphragm in the middle line and lying posteriorly to the liver and piercing the diaphragm to the vena caval inferior into which can be seen opening some of the large hepatic veins. The upper part of the abdominal cavity is therefore cut into in this section; but we also find that posteriorly the lower part of the thoracic cavity on the right side has been opened into. The lower part of the thoracic cavity therefore lies at the same transverse
place as the upper part of the abdominal cavity, and hence the possibility of a punctured wound, passing straight backwards opening into both cavities. In the right pleural cavity we find the base of the right lung. On raising the lung it is seen that the pleural cavity extends downwards still further to the level of the 9th dorsal vertebra.

In the middle line again, is the lower part of the body of the 9th dorsal vertebra, the vertebral canal and spinal cord, the transverse process and the commencement of the spinous process. Externally to the vertebral body is the head of the 9th rib, and outside that the shaft of the 6th rib. The arm is also seen in section, showing the humerus in the lower third of its shaft, and the muscles which lie anteriorly and posteriorly to it.
The transverse section represented in Plate X is at the level of the disc between the bodies of the 10th and 11th dorsal vertebrae. Anteriorly we find the skin and fat and muscle of the anterior abdominal wall, and then filling up the abdominal cavity is seen the large right lobe of the liver. In front of the liver lies the lower costal cartilage externally and posteriorly are the ribs and intercostal muscles, whilst in the middle line anteriorly only the muscles of the abdominal wall are to be seen covering. We have to note the vena cava inferior lying behind the liver and passing upwards to pierce the diaphragm and enter the right auricle of the heart. We notice also in the substance of the liver divided blood vessels and ducts. We have to note also in this section...
that the apex of the right supra-renal capsule is seen lying posteriorly to the liver and alongside of the body of the 11th dorsal vertebra. This point is especially to be noted as giving us the level in the abdomen to which the right supra-renal capsule reaches. Behind the liver in the middle line is the diaphragm, and behind that the disc between the 10th and 11th dorsal vertebra. The vertebral canal containing the lower part of the spinal cord and membranes is also seen, and externally so is the inter space between the transverse processes of the 10th and that of the 11th dorsal vertebra.

Externally are seen the 8th, 9th, and 10th ribs in part. Posteriorly are seen in section the muscles of this part of the back. Compare this plate with Plate IX, Fig. 1, in Symington's Atlas.
Plate XI Case A

This plate represents a transverse section through the right side of the trunk at the level of the middle of the body of the first lumbar vertebra.

The important structures seen in this section are the liver and gall-bladder, the right kidney and its suprarenal capsule, the duodenum, the pancreas, part of the large intestine, the vena cava inferior, the vertebral column in the lumbar region and the cauda equina in the spinal canal.

This section, further, may be compared with those seen in Plate X (Fig. 102) in Symington's Atlas.

Anteriorly we note the skin, fat, and muscular layers of the anterior abdominal wall. Lying behind these structures is the right lobe of the liver, and it is to be noted that the liver at this level just crosses the middle line anteriorly. Further the impressions on the surface of the liver are to be
noted. There is at a distance of 2 cm in front of the body of the 15th lumbar vertebra the groove for the gall-bladder, which latter structure is seen in section, surrounded in front and at the sides by liver substance and posteriorly and laterally in contact with the second part of the duodenum. Again, lying still more to the back is the impression for the right kidney and supra-renal capsule and it is to be noted how very distinct the renal impression is showing as it does very clearly the pliable character of the liver and the ease with which it moulds itself to surrounding structures.

In the middle line behind the liver is a small portion of the transverse colon of the large intestine, only a small part of its is seen in this section, the rest being well displayed in Plate I.
Behind this portion of the transverse colon and behind the adjoining border of liver, is the head of the pancreas bounded above (as made out by dissection) by the 1st part of the duodenum, and externally by the 2nd part of the duodenum and the vena cava inferior.

The second part of the duodenum is seen in this section at the point where it turns to run downwards and again upwards towards the middle line as the third part of this portion of the duodenum inferior. The vena cava inferior is behind and to the inner side of the second part of the duodenum.

Lying behind duodenum and inferior vena cava is seen the right suprarenal capsule clothing the anterior surface of the upper part of the right kidney.

Posteriorly at a distance of 5 mm from the body of the 1st lumbar vertebra.
to the right kidney itself in transverse section. The section through its upper part, and the colour and structure as visible to the naked eye are well represented in this plate. Behind the kidney we find a little of the fat which forms its tunics adiposa.

Again returning to the middle line we find the body of the 7th lumbar vertebra and behind it the vertebral canal containing the spinal cord, or rather the commencement of its conus equina. Behind the vertebra are the muscles of the lumbar region, and laterally are seen the divided floating ribs.

This section measures in an antero-posterior direction in the middle line 4.6 cm, and its greatest transverse diameter is nearly 7 cm. (Giving a total transverse diameter of this part of the body of 13.6 cm.)
Plate XII  Case A.

This plate represents a section made at the level of the body of the 4th lumbar vertebra. Anteriorly we find the skin, subcutaneous tissue, and rectus abdominis muscle of the right side. We observe also that nearly the whole of the abdominal cavity is occupied by the coils of the small intestine (jejunum and ileum). In the middle line however we note a part of the cecum or commencement of the large intestine.

Immediately in front of the body of the 4th lumbar vertebra we find the inferior vena cava which has been formed by the junction of the right and left common iliac veins at the level of the 5th lumbar vertebra. The aorta is not seen in this plate so it lies more to the right side. The 4th lumbar vertebra has been divided.
through about the middle of its body and we see in the spinal canal the cauda equina.

External to the lumbar vertebra is the psoas muscle and lying in front of it is the right ureter as it passes downwards through the pelvis wide.

Lying external to the psoas muscle and surrounded by fat is the lower part of the right kidney.

The abdominal wall in this section but is made up of oblique superior, and inferior, and of the transversalis; but it is especially to be noted that in this section we find the lower margin of the liver lying between the above mentioned muscles and the small intestine which fills up the abdominal cavity. This point was quite satisfactorily demonstrated by dissection.
Plate XIII  Case A.

This section was made at the level of the second sacral vertebra, but it will be remembered that in the sacral region the saw deviated considerably to the right side of the middle line. hince in this drawing we find only the right iliac bone depicted. The right iliac bone is seen running outwards and forwards to the anterior superior iliac spine, at which point there is seen to be a cartilaginous plate. Behind the iliac bone are the three gluteal muscles, and in front of it is the iliacus muscle.

Lying in front of the iliacus muscle we observe the anterior cruciate nerve and to the inner side of this the external iliac artery and vein, the former lying in front of the latter as they pass towards Poupart's ligament.
Description of Drawings in Case B.

Clinical Notes of Case B.

The infant, which has been named Case B, was sent to me in the beginning of March 1888, by Dr. Allan Y. Sloan of this city, who also was kind enough to supply me with the following clinical notes of the case.

The mother, a healthy woman, had given birth to twins; one of which presented by the vertex was born alive, was a female, and weighed 6 lbs. 9 oz.; the other, which was the one which Dr. Sloan was so kind as to give to me, presented as a footling, was a male, and was still-born weighing 8 lbs. 4 oz. The mother had previously had seven other confinements, all of which were normal and in all of which the children were born alive and healthy.
I made a post-mortem examination of the male child, and came to the conclusion that it must have died during labour, probably from delay in the second stage whilst the head was in the passages. The lungs contained no air, the right side of the heart was dilated and contained blood clot, the foramen ovale was patent, and there were no naked eye pathological appearances in any of the other viscera. A drawing of the appearances seen when the abdomen was opened was made (vide Plate I), and the brain was removed and placed in hardening fluid (Müller's Spirit) whilst the viscera (lungs, kidney, heart, thymus gland, and pituitary body) were placed in Müller's fluid for future microscopic investigation.
In the specimen from which this drawing was made the abdomen was opened in the middle line from the euniform cartilage to the symphysis pubis, but in the region of the umbilicus the incision was carried a little to the right side of the middle line so as to preserve intact the attachment of the umbilical cord. A transverse incision was then made at a point immediately above the umbilicus, and this incision was prolonged outwards both on the right and left side. The abdominal wall was thus divided into four segments, two superior and two inferior, by means of this cruciform incision. The two upper segments were termed outwards and so was the inferior segment of the right side, but the left inferior segment was
left in situ in order to leave undisturbed the connections of the umbilical cord. The left lobe of the liver was then raised and kept in position by means of a hook, whilst the right lobe was drawn slightly outwards and fixed in position by the same means. A drawing was then made of the structures thus displayed before any further dissection was made.

We have to note, in the upper part of the drawing, the liver as it lies in relation to the ribs and costal cartilages. The liver is seen to have a dark chocolate red colour which is the characteristic tint of the liver in the newly-born infant. In the case of the liver of the child and adult we find that the colour is not so dark. The free anterior margin of the liver is seen as nearly its whole extent in this
drawing, and we observe that the left lobe is not so small in that position as in the right as in the adult liver, in fact, in this case the left lobe is very nearly 3/4 the size of the right. In the anterior free margin we note the little dip which marks the commencement of the anterior part of the longitudinal fissure, and surrounding into this fissure is the subhepatic vein. On the undersurface of the right lobe is seen the gall bladder which has its characteristic dark green colour. The gall bladder lies in a fossa which intervenes between the lobus quadratus inferriorly and the right lobe of the liver externally and this groove is known as the fossa clypeus of the liver. In this case it is to be observed that the liver when in position overlaps
The stomach reflex, pancreas, duodenum, part of the transverse colon and on the right side part of the small intestine. The deeper relations of the liver are not visible in this drawing.

The stomach, in a collapsed condition is seen lying under the left lobe of the liver. It passes at first vertically downwards and slightly outwards to the left from its fundus, it then makes a sharp curve towards the right and runs nearly transversely towards the middle line of the body at the level of the 1st lumbar vertebra where it is its pyloric end it becomes continuous with the first part of the duodenum. Its transverse diameter varies from 1 to 2 cm and is greatest in the region of the fundus, its length from fundus to pylorus is 7 cm.
Attached to the lower border of the stomach is the great omentum, whilst at its upper border we have the gastro-hepatic omentum, but we do not in this specimen get a view of the gastro-epiploic omen-
tum. The finicky white colour of the stomach stands out in marked contrast to the dark tint of the liver.

The spleen is to be seen lying in the left hypochondriac wound cover of the liver and also partly under cover of the fundus and greater curvature of the stomach. We note its purplish or dark bluish colour and its somewhat oval shape, the long axis of the oval recurring nearly vertically. The parts of the spleen here displayed are its anterior margin and its external convex surface. The part of the spleen in this drawing measures 3 cm in vertical extent.
The pancreas is not seen in this Plate; for it lies under cover of the stomach, having its tail in contact with the spleen and its head embraced by the curvature of the duodenum. The great omentum is seen attached to the lower margin of the stomach and passing downwards to cover the transverse colon of the large and part of the small intestine. Its small size and transparent character are especially to be noted, and we can also see very clearly the bloodvessels running in it. It is seen to measure about 2 cm. in vertical extent and about 4.5 cm. in a transverse direction.

The transverse colon, which was distended with meconium, lies behind the upper part of the great omentum and gives to that part of the omentum a peculiar greenish tint.
At the left side we note the splenic flexure of this part of the large intestine, and also the commencement of the descending colon.

Behind the lower part of the great omentum lie some coils of the small intestine, and on the right side of the abdomen the small intestine is displayed as low down as the brim of the pelvis.

The cord is seen to be inserted at the umbilicus which is situated in this case 7 cm. above the symphysis pubis, and from the umbilicus the umbilical vein can be traced upwards to the longitudinal furrow. The vein passes along the free margin of the suspensory ligament of the liver.

In the lower part of the drawing are seen the external genital organs and the inguinal regions of the child.
In Case B. The thymus gland was removed from the body and the above slight outline sketch will give an idea of its shape and size.

It is seen to consist of two lobes, a right and left, with an indication at its upper part of a third or intermediate lobe.

In this case the left lobe measures nearly 2 inches in vertical extent, and is about 1/2 inch broad. The right lobe has a smaller vertical measurement (a little over 1/2 inch), but is broader (nearly 1 inch).
The breadth of the whole gland was found to be 1 1/2 inches, and the two lobes are seen to be in contact for a distance of 1 1/2 inches. The antero-posterior diameter of the thickness of the gland was 3/4 inch. The two lobes were held together by areolar tissue, and what seems to be the third lobe was also partially separated from the left lobe by areolar tissue. The upper part or apex of the gland was found to lie a little above the manubriocric sterni in the region of the neck, while the base of the gland lay in the thorax at the level of the lower part of the body of the 4th dorsal vertebra. It had a pinkish colour as seen in section.

The child was a large male as will be remembered, and probably all its organs, including the pharynx, were a little above the median size.
Case 6.

Clinical Notes of Case 6.

On the 12th of January, 1889, Dr. T., a primipara, 20 years of age, was delivered at the Royal Maternity Hospital of a full term living female child. The labour was normal, the first and second stages lasted 14 hours, the third stage 20 minutes, and the child presented by the vertex in the face. occipito infra anterior. The child weighed 6 lbs. 12 oz., and the placenta 1 lb. 9 oz. The size of the placenta was "4 inches x 4¼ inches. The length of the child was 19½ inches, and of the cord 18 inches.

Dr. Thos. Arthur Hulme was the resident surgeon present at the confinement and the following measurements of the child's head were made by him:

Diameter occipito-mentalis — 4½ inches
" " frontalis — 4 4 inches
Diameter sub-Occipito-Bregmaticus - 3 1/4 inches

" Bi-Parietalis - 3 7/8 inches

" Bi-Temporalis - 2 3/4 inches

The circumferences were:

in occipito-mental plane - 14 inches

" occipito-frontal plane - 12 1/2 do.

" sub-occipito-bregmatic plane - 11 1/2 do.

The child was born at 4:30 a.m. and in the afternoon of the same day

the nurse in attendance noticed that the child's lips became blue, that the face became black, its pulse almost imperceptible, and its breathing rapid and shallow. In a few minutes the child was dead. There was no known cause for death except a rumour that the child had been allowed to fall out of bed during the afternoon.

The body was put into a freezing mixture on the afternoon of the following day, January 18th.
Before, however, placing the body in the freezing mixture I made the following measurements:

Total length of child 19 inches,
Length from vertex of head
  Acromioclavicular tubercle 12 1/2 inches.
Diameters of Head
  Diameter Occipito-Mentalis 3 1/8 inches
  do. do - Frontalis 4 3/8 do.
  do. Sub-Occipito-Bregmatica 3 7/8 do.
  do. Bi-Parietalis 3 3/4 do.
  do. Bi-Temporalis 3 1/4 do.
Diameters of Trunk
  Antero-posterior diameter of
    chest at the level of the
    lower end of the sternum 3 3/8 inches
  Transverse diameter at the
    level of the shoulders 5 1/8 inches
  Transverse diameter below
    the axillae 3 1/8 inches
  Antero-posterior diameter
    of the abdomen at the
    level of the umbilicus 3 1/2 inches
Transverse diameter of abdomen at the level of the umbilicus

Bi-trochanteric diameter

The body showed marked hypostasis at defendant parts and there was no rigor mortis.

The umbilical cord had begun to ulcerate off, and as it had been tied with an inelastic material it was noted that the ligature was no longer tight.

If the measurements of the head made at the time of birth be compared with those made after death on the 5th day it will be observed that the latter measurements are all greater.

<table>
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<th>Measurement</th>
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<th>5 days later</th>
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<td>4 7/8&quot;</td>
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<tr>
<td>O. T.</td>
<td>4  do.</td>
<td>4 3/8&quot;</td>
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<tr>
<td>S.C.B.</td>
<td>3 3/4  do.</td>
<td>3 7/8&quot;</td>
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<tr>
<td>Bi-P</td>
<td>3 7/8&quot;</td>
<td>3 3/4&quot;</td>
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<tr>
<td>Bi-T</td>
<td>2 3/4  do.</td>
<td>3 1/4&quot;</td>
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</table>
Preparation of Sections in Case C.

The infant, which I have termed Case C, died, as will be seen from the clinical notes, on the 5th day after birth. It came into my hands the following morning and was put into a freezing mixture on the same day. In this case I used broken up ice and salt as the freezing medium and allowed the body to remain for 18 hours in that mixture. It was then removed and sections made in the usual way. It should be noted, however, that the body was placed in the mixture in an extended position, the legs and thighs were extended in a line with the trunk and the head was not flexed upon the sternum.

A series of vertical coronal and sagittal sections were made of head, thorax and abdomen, and pelvis, and one
transverse section was also made at the level of the first piece of the sacrum. It will be noted, also, that most of the sections were made somewhat obliquely. The following drawings were made from the sections:

I Vertical Sections

a. Coronal

1. Section through anterior part of thorax and abdomen

2. Section through thorax and abdomen posterior to No. 1, passing on the right side through the shoulder joint

3. Section through head passing at the level of the anterior portion of the orbital cavity, the right side of the section being at a level posterior to the left side

4. Section through head at the level of the middle fossa of cranium

5. Section through head at the level of the ears, just in front of external auditory meatus
b. Sagittal.
1. Section through pelvis in the middle line, looking to right. Plate VII
2. Opposite side of No. 1, looking towards the right side. Plate VIII
3. Section a little to left of middle line, looking towards the left side. Plate IX

II. Transverse.
1. Section at level of base of sacrum, looking downwards. Plate VI

A drawing was also made of the external genital organs, before the body was placed in the freezing mixture, and this forms—Plate X.

A small sketch of the uterus in its part is also added and forms Plate XI.
Case 6. Plate 1

This plate represents a coronal section of the thorax and abdomen. Superiorly the section passes through the 3rd piece of the sternum, whilst inferiorly it passes in front of the kidneys uteri and behind the bladder, neither of which organs are therefore seen in this drawing. Again, the section is somewhat oblique laterally, so we find that the left side is on a plane superficial to the right side of the body. Be note, therefore, that on the left side the section divides the third costal cartilage at its junction with the sternum, whilst on the right side the 3rd costal cartilage is cut through in a deeper plane and at a distance of 1/2 inch from its sternal attachment.

A full description of all the structures seen is not necessary, as many of the points have been already noted in connection with Case 1; but we shall look at some
details which bear upon the position of the thoracic and abdominal viscera as seen in coronal sections.

The Thorax.

We see here the walls of the thoracic cavity in the plane of the 3rd piece of the sternum; and since the section is a little oblique we see on the right side three ribs and four costal cartilages, whereas on the left side we note only five costal cartilages. On the right there are the costal cartilages of the 3rd and 4th ribs with an inter-costal space measuring 8 mm. Then follow three ribs seen in section, the 5th, 6th, and 7th, with interpaces of 5 mm, 5 mm, and 4 mm respectively. Inferiorly we find the 8th and 9th costal cartilages with interpaces of 6 and 8 mm respectively. On the left side we note the 3rd costal cartilage at its point of union with the 3rd piece of the sternum, and below it
the 1st, 5th, 6th, and 7th costal cartilages, with interspaces of 5, 7, 8, and 3 mm. respectively.

Anteriorly to the bony framework are seen in section the pectoralis major and minor muscles.

The vertical extent of the thoracic cavity in this plane and in the middle line is 2½ cm (1 inch), whilst the transverse diameter in the plane of the 7th costal cartilage is 5 cm. (2 inches), and at the level of the central tendon of the diaphragm it is nearly 4 cm. (2¾ inch).

In the right lateral portion of the thoracic cavity are seen the right lung and pleura, and we note the division of this lung into three lobes, an upper, middle, and lower. Only a small part of the lower lobe is seen, and we observe only the commencement of the fissure which separates the upper from the middle lobe. The vertical extent of the right lung in this plane is about 8 cm., and it
transverse diameter 1.2 cm. The child had breathed and, therefore, the appearance of the lung differs considerably from that represented in Cases A, D, and others. On the left side the section passes anterior to the lung of that side. The heart is seen filling the middle and left lateral portions of the thorax in this plane, and we note that whilst the right auricle has been opened into the right ventricle is divided in the thickness of its wall only at two points in its cavity cut into. The heart seems to lie in the pericardial sac.

In the region of the right auricle the heart measured in vertical extent 2.5 cm, and in that of the right ventricle from 2.2 cm in the middle line of the body to 1.5 cm in the lateral part of the thoracic cavity. The thin walled right auricle is opened into and in its interior is seen lying a yellowish white structure to which we shall again recur. The thicker walled right
ventricle is only opened into at two points. Superiorly we note the sulcus between the atriole and ventricle.
The Abdomen.

In the region of the abdomen also the section has passed obliquely, the left side being superficial to the right, but the obliquity is not so great as in the region of the thorax.

The Liver. We see in this section the right and left hepatic lobes, the lobus quadra-
datus, and a small portion of the lobus
epigastrii. The liver has a maximum transverse diameter of 9 cm., in the region of the right lobe it measures vertically 6 cm., in that of the quadrate lobe 4 cm., and in that of the left lobe 5 cm., its vertical measurement is a little more than 4 cm.

Its upper and lateral portions are seen to be moulded to the diaphragm and abdominal wall, whilst its lower edge is in contact with spleen, stomach, duodenum, hepatic flexure of colon and small intestines, the structures being
named in order as we pass from the left to the right side. The moulding of the liver is in the region of the stomach is to be noted. In both the right and left lobes we note a large hepatic vein the right and left. Only the anterior tip of the lobeus Spigelii is to be seen in this section, and at this point we observe the longitudinal fissure of the liver with all its branches the umbilical-vein distended with blood clot. Between the longitudinal fissure and that for the gall-bladder is the quadrate lobe of the liver, and in the latter fissure the gall-bladder is seen in transverse section.

The spleen, only a very small part of the spleen is seen in this section and that part is found wedged in between the stomach, the left lobe of the liver, and the transverse colon at the point where it turns downwards and backwards to form the splenic fissure. The part of
the spleen here seen is the tip of its anterior border.
The stomach, which was moderately distended with watery mucus, is seen lying under the left lobe of the liver. The almost vertical direction of its lesser curvature is seen, and in the middle line of the body and inferior to the quadrate and Spigelian lobes is the pylorus and commencement of the first part of the duodenum

The Transverse Colon. Be note both the hepatic and the splenic end of the transverse colon, the great portion of this part of the large intestine along with the mesentery lies superficial to the plane of this section. Be note the absence of meconium from the intestine, a point which is especially striking when we compare the sections in this case with those of Lucas Abbad D. and also in the case of the ancepscephalic seven months fetus.
The Cecum. Above the right iliac crest we note the cecum, and on looking deeply at this point we observe the ileo-caecal valve, through which a probe can be passed into the adjoining coil of bowel, which is, therefore, the lower end of the jejunum. The ascending colon is not seen as it lies under cover of the small intestines, but a probe can be passed from the cecum upwards to the commencement of the transverse colon.

On the left side, above the left iliac crest, is seen the sigmoid flexure. The rest of the abdominal cavity is filled up with the coils of the jejunum and ileum.

The star (*), placed 3.5 cm below the longitudinal flexure of the liver, marks the position occupied by the umbilicus on the anterior surface of the body.
Lace G Plate II.

This Plate is a representation of a section (coronal) made on a plane posterior to that seen in Plate I. Above the section has passed through the first piece of the sternum (the vertebral cartilage manubrium being visible), while in its lower portion the section has cut through the projecting fourth and 5th lumbar vertebral bodies.

The section, as in that represented in Plate I, runs somewhat obliquely from right to left: thus on the right side the shoulder joint is cut into and the tip of the coracoid process divided while on the left side the section runs anterior to the shoulder joint of that side. In the region of the abdomen there is also some obliquity, the left side being more superficial than the right, but this is not so marked as in the thorax.
Case II. Plate II

The Thorax.

In this Plate we find that the thorax and its contents are well seen. In the middle line we find the thymus gland and heart, and laterally are the lungs, the framework of the thorax.

Superiorly we note the manubrium sterni cut across anterior to the sternoclavicular articulations and showing its osseous centre. Laterally we find attached to the sternum the cartilages of the first ribs, that on the right side being more apparent from the obliquity of the section. The breadth of the sternum at this point is 2 cm. On the right side the section has passed through the 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, and 9th ribs, on the left side, which it will be remembered is superficial. The section runs through the costal
cartilages of the 2nd, 4th, 6th, and 7th ribs and through the shafts of the 3rd, 4th, 5th, and 6th ribs. The 4th rib is divided at its junction with its costal cartilage. The intercostal spaces vary from 1 cm to 5 mm in breadth, the spaces in the upper and in the lower regions of the thoracic wall being larger than those in the intermediate part.

Between the ribs are the intercostal muscles, and outside the thorax are the pectoral muscles. On the right side also is seen the shaft of the humerus and above it the cartilaginous head of the bone, whilst internal to the head is the coracoid process of the scapula.

The vertical diameter of the thorax in the middle line is 14.5 cm, its transverse diameter is 14.8 cm at the level of the 2nd costal cartilages and 8 cm at the level of the 6th rib.
The Thymus gland.

The thymus gland lies behind the manubrium sterni and in front of the aorta and pulmonary artery. It is quadrilateral in shape, its superior and inferior sides being longer than the lateral ones. It is clearly marked off from the aperies of the lung and the pericardial sac. Its transverse diameter at this level is 2.2 cm, and its vertical 1.1 cm. Its colour is a whitish pink.

The lungs.

In this section both the lungs are divided anteriorly to their roots, but the left lung is cut through in a plane anterior to the right. The right lung is seen to be in contact with the chest wall on the right side from the first costal cartilage.
to the middle of the 7th intercostal space. Its upper border is in relation above with the thymus gland and lower down with the superior vena cava and the right auricle of the heart. The inferior border is seen to be moulded to the diaphragm. We note the three lobes into which this lung is divided, an upper, middle, and a lower. Part of the thymus which divides the upper lobe from the middle is seen, and the whole of the fissure dividing the latter from the lower lobe. The vertical extent of this lung in this plane is 4 cm. The upper fissure lies opposite the 4th rib, the lower opposite to the 6th. Leg of the left lung is seen in this section, for the heart which was distended with blood clot lies on the left side of the middle line and also because the plane of the section is more superficial on the left than on
the right side. We note that at this plane the left lung extends from the 1st costal cartilage to the 4th rib at its junction with its cartilage, that it is in contact internally with the thymus gland and with the left ventricle of the heart, the pericardium alone intervening, and that its lower margin rests upon the diaphragm above the left lobe of the liver. The upper lobe of this lung is seen in the great part of its extent, but only a small part of the lower lobe is visible. The fissure dividing the two lobes is seen to be at the level of the 6th rib in this plane. The vertical extent of the left lung is in this section 4 cm. and the transverse 1 cm. except at its lower border where it is a little more.

The pleural sacs contain no fluid, and we therefore find the visceral and parietal layers in close contact.
The Heart

The heart is seen lying in the pericardial sac and the cavities opened. The right auricle and the left ventricle. The right auricle is seen filled with a large clot which is the posterior part of that represented in Plate I, and this clot is found to be continuous with one lying in the inferior vena cava and through that with the clots in the ductus venosus and hepatic veins. Blood clot is also seen in the mouth of the vena cava inferior which is seen opening into the auricle at a point on a level with the 3rd rib and 1.5 cm. below the manubrium sterni. The opening of the inferior vena cava is on a deeper plane than this, whilst the tricuspid orifice leading into the right ventricle is situated nearer the anterior surface of the body.
portion of the right auricle seen in this section lies to the right side of the middle line of the body. To the left side of the middle line is found the left ventricle with its thick muscular (15 mm). In its interior also we find blood clot, a fibro which clot extending upwards from its cavity into the aorta. The aorta is seen to cross from the left to the right side of the middle line and to pass under cover of the thymus gland. To the left side of the aorta atthis level is the commencement of the pulmonary artery, and to the right side is the vena cava superior. The pulmonary is, in this section, cut across at its point of origin from the right ventricle, it lies in the middle line of the body under cover of the thymus gland, and it contains blood clot. The pericardial sac contains no fluid.
Passage 6. Plate II.

The Abdomen.

This section has passed through the abdomen obliquely, thus on the right side the kidney is divided in the whole of its vertical extent, whilst on the left only the anterior margin of the renal organ is divided.

The Diaphragm.

The diaphragm is seen stretching across the body cavity and dividing the thoracic from the abdominal cavity. Its level is a little higher at the sides and especially at the right side than it is in the middle line. The upper border of the diaphragm is seen to be sinusous, there being a depression in the middle line under the heart, and an elevation at each side under the lower margins of the lungs. The diaphragm is divided just in front of the opening in the tendon which gives passage to the vena cava inferior.
The liver.

We have to note the liver as it lies in the upper part of the abdominal cavity and under the diaphragm. In this section, the right and left lobes and the lobule Epigoni have been divided.

The whole organ measures in a transverse direction 9 cm., and it has a vertical measurement of 5 cm. on the extreme right, 3 cm. at the point where the vena cava inferior runs posterior to it, of less than 1 cm. in front of the opening on the diaphragm for the vena cava and of 1.5 cm. in the region of the left lobe.

The upper border of the liver is in contact with the diaphragm in the whole of its extent and is at the level in the coronal plane of the divided 7th ribs. A little to the right side of the middle line we note the ductus venosus as it passes to join the inferior vena cava.
Immediately under the duodenum ventricus is the posterior part of the longitudinal fissure of the liver dividing the left lobe from the lobus spigelii. On the right side the abdomen is in contact with the abdominal wall, its lowest point being 2 cm. above the right iliac crest. On the left side the liver does not descend nearly so low being 1 cm. above the iliac crest on that side.

The under surface of the liver is seen to be in contact with and to be moulded to various organs. Thus in this coronal plane we see that on the left side the left lobe is moulded to the spleen in the middle line the left lobe touches the stomach near its cardiac end, under the lobus spigelii we find the head of the pancreas, and on the right side we find that the liver is in contact with the vena cava inferior, the right suprarenal capsule, and the right
Looking at the form and relations of the liver in this Plate, we must not forget that the section is oblique and that on the left side the parts seen are on a plane anterior to those on the right side.

The stomach.

Only a small portion of the stomach is seen in this section, and that is the part near the cardiac end. We can pass a probe upwards backward and to the right side from this part of the stomach into the esophagus. The stomach is seen to lie above the pancreas, and under cover of the under border of the spleen and for a small distance under cover the liver. We note also that the cardiac end of the stomach is immediately behind the part of the longitudinal hepatic fissure here represented. The tunics membrane of the stomach was smooth and its cavity contained watery mucus.
The Spleen.

The spleen, in this plane, is seen here almost vertically downwards from the lower surface of the left hepatic lobe as a point within 1.5 cm. of the left iliac crest, at the same time it inclines towards the left side as it proceeds downwards. It has therefore an inner border in the concavity of which lie the stomach, pancreas, and a small round dark body which on microscopic examination was found to be an accessory spleen. Its external convex surface, which is also superior, is in contact with the left lobe of the liver (spleenic impression) and with the abdominal wall. The lower margin is seen to be in contact with the splenic flexure of the colon. The spleen measures a little over 4 cm. in its vertical diameter and from 1.5 cm. to 1 cm. transversely. In colour the spleen is seen to be much darker than the liver.
The Pancreas.

This organ, which is badly defined, is seen to lie inferior to the lobus epigastri of the liver and to the stomach. It crosses the middle line about 3 cm. above the level of the umbilicus (which is marked by a star *), and has its larger end (the head) at the right side of the middle line and its smaller extremity (the tail) on the left side in contact with the spleen. In contact also with the pancreas is the splenic vein as it runs transversely from the spleen. Below the pancreas, in the middle line of the body is a loop of small intestine which marks the end of the 3rd part of the duodenum and the commencement of the jejunum.

The pancreas is pale pink in colour, and as above stated its outlines are very difficult accurately to define. It measures about 4 cm. in its transverse extent.
The Kidney.

On the right side we see the kidney divided in its vertical extent and we note that it lies in its capsule of fat (tunica adiposa). The right renal vein is seen passing upwards and forwards to join the vena cava inferior under the lower border of the liver. The vein emerges from the hilum, and at a deeper level are the right hepatic artery and the right ureter. The upper end of this kidney is seen to lie in contact with the right supra-renal capsule, its outer border is in contact with the right lobe of the liver (renal impression) and its lower end is seen to be in relation with the right iliac crest.

The inner concave border of the kidney is in relation with the end part of the duodenum and with the psoas muscle of the right side. In vertical extent this kidney is seen to measure a little over 3.5 cm, whilst the greatest...
The transverse diameter in this plane is 2.5 cm. The naked-eye appearance of the kidney is well seen on the left side. The kidney is divided anterior to its hilum and the part thus cut across has a somewhat circular shape. Below it and external to it is the splenic flexure of the colon. Its internal margin is in contact with the pector muscle of the left side. At a deeper level it comes in contact with the spleen which is moulded to it and to its suprarenal capsule.

The suprarenal capsules only the right adrenal is seen at all in this section, the left lying behind the pancreas. Further it is only that part of the right suprarenal capsule which lies between the right renal vein and the under surface of the right lobe of the liver which is visible in shape it is triangular.
The Large Intestine.

Only one part of the large intestine is shown in this plate, the splenic flexure of the colon. The flexure has been cut across at two points, and we note that it lies under the lower margin of the spleen at the level of the 3rd lumbar vertebra. It is also in contact with the outer surface of the left kidney.

The Small Intestine.

Two small portions of the small intestine are seen in this drawing, the commencement of the jejunum in the middle line of the body, and the 2nd part of the duodenum near the hilum of the right kidney.

Muscles.

We note both the right and left psoas muscle, the iliacus on both sides, and also the gluteus muscles on the outer surface of the iliac bone. The muscles of the abdominal wall are also seen in section.
The Vertebral Column.
The section has passed through the anterior part of the vertebral column in the lumbar region at the level of the 4th and 5th lumbar bodies. The iliac bones are divided, the left being divided in a plane anterior to the right. Their cartilaginous crests are well depicted.
The abdominal aorta is cut into about the level of the 2nd lumbar vertebra behind and of the umbilicus anteriorly. The inferior vena cava is on the left of the aorta as seen in the greater part of its extent, as is also the right renal vein. The right also the left common iliac vein and a small part of the right. As has been already stated the ductus venosus is seen below the diaphragm and in the longitudinal hepatic fissure, and the splenic vein is cut into as it passes to the portal vein.
Case 6. Plate III

This Plate is a representation of a coronal section through the head in a plane posterior to the crystalline lens of the eye on the right side and in a plane anterior to that on the left side of the preparation. It shows very well the relations of the orbital, nasal and buccal cavities in this plane. This section, like most of the others in Case 6, is an oblique one, the parts on the left side of the middle line being on a level superficial to that of the right side.

The Orbits on the right side the section has passed through the orbit behind the crystalline lens and through the aqueous humor of the eye. The frontal bone lies superiorly, as do the supra-orbital and frontal arteries...
The eye-ball in this plane measures 12 mm. vertically and 14 mm. transversely, in the outer side of the eye-ball and superiorly lies the lachrymal gland, and we note also one or two of the muscles. Thus on the outer side is the external rectus, inferiorly is the inferior oblique crossing transversely below the inferior rectus, and superiorly is the levator palpebrae superioris and by making a little direction the pulley of the inferior oblique muscle are seen. Under the eye-ball the malar bone is seen cut across. On the left side the eye-ball is divided in front of the crystalline lens which can therefore be seen as a round pink body. The fascicula palpebralis can be seen in its outer part, and we note also the muscular fibers of the orbicularis palpebrarum muscle. Below and to the inner side of the eye is the superior maxillary bone. In this side the section is anterior to the malar.
The Nasal Fossa

We note in the middle line the septal cartilage of the nose covered by pink mucous membrane as are also the lateral walls. The cartilage alone is 1 mm. in thickness, but with the mucous membrane it measures 2 mm. in thickness. Its vertical measurement is 1.4 cm. We note the inferior, middle, and a small part of the superior meatus on each side, and we also observe the inferior concha separating the inferior from the middle meatus. The superior maxillae are seen forming the floor of nasal cavities at this level, and also lying laterally. The superior maxilla on the right side is divided at in the plane of the antrum of Highmore that on the left side anteriorly to it. We note the canine teeth of the upper jaw in their cavities. Neither of the nasal ducts has been opened wide in this section.
The Buccal Cavity.
The mouth has been divided in a plane immediately posterior to the symphyseal menti, and we note inferiorly the commencement of the geniohyoid muscles. In the inferior maxilla are seen the canine and incisor teeth. The tongue is divided transversely immediately behind the frenulum, and we note how accurately the dorsum linguae is adapted to the roof of the mouth; there being slight depressions corresponding to the gums. There is, therefore, no real buccal cavity.

Externally are seen the buccinator muscles, and we observe on their outer surfaces the fat of the cheeks and the distinctly encapsulated lobules of adipose tissue which have been called the sucking pads or cushions. The pad of the right side is wider transversely than that on the left, for it is divided in a plane posterior.
Case C. Plate IV

This Plate represents a coronal section of the head in a plane posterior to that seen in Plate III. The section runs posterior to the orbital cavities, but on the right side it is in a plane anterior to that on the left side, therefore the section is a somewhat oblique one. Inferiorly the pharyngeal and laryngeal cavities have been opened into. The section is quite anterior to the level of the ears.

The Cranium.

Superiorly and in the middle line the section passes through the posterior end of the frontal sinus immediately in front of the anterior fontanelle. Lying under the frontal sinus is the superior longitudinal cranial venous sinus, and under it the false cerebellum anterior part of the longitudinal
the fissure which intervenes between the two cerebral hemispheres. On the right side of the head is seen the frontal bone from its surface in the middle line superiority to its point of junction with the great wing of the ethmoid bone inferiorly. On the left side of the head, however, the section only passes through a small part of the frontal, then through part of the left parietal bone, the coronal suture intervening between the two bones, and then lower down through the squamous and petrous parts of the temporal bone. On the left side therefore the section is in a plane considerably posterior to that on the right side.

To return to the right side, we note that immediately to the right of the middle line the section has passed through the small wing of the sphenoid and through the anterior clinoid process on that side. Below this
part of the sphenoid is the sphenoidal pedicel and below that is seen in section the orbital plate of the right great wing of the sphenoid and the foramen rotundum and internally to it the Vidian or pterygoid canal.

Between the small and great wing of the sphenoid is the anterior end of the middle fossa of the base of the cranium with lying in it the lip of the temporal sphenoidal lobe of the right cerebral hemisphere. Inferiorly we note the commencement of the pterygoid process of the right side.

In the middle line is the basisphenoid and in the left side of it the section has passed obliquely backwards through the anterior part of the petrous part of the temporal, through the same bone at the point of origin of the zygomatic process, and through the squamous part of the temporal bone above the level of the zygoma. Near the
middle line on this side is seen part of the foramen lacerum medulla in which is the left internal carotid artery. Under the root of the zygoma on this side is the coronoid process of the inferior maxilla seen in section. From the obliquity of the section the parts at the base of the cranium are at first right a little puzzling.

The Brain.

On each side we note inferiorly the temporal sphenoidal lobe of the cerebrum, on the right side this lobe is divided near the anterior end, on the left side it is divided posteriorly to this level. We note in the middle line the corpus callosum divided transversely and externally so it on each side is the cavity of the lateral ventricle containing the choroid plexus. Superiorly is the longitudinal fissure with the gala cerebri, near its anterior end,
The Eustachian Tubes

On the right side we note in section the Eustachian tube. Its walls are of cartilage and we note that they are deficient inferiorly and externally. It lies anterior to the inner side of the petrosal process and below the Vidian foramen at the root of that process. The probe passes through it outwards and backwards to the tympanic cavity.

On the left side the Eustachian tube is divided also in its cartilaginous portion. The tube is cut through immediately anterior to the point at which it runs into the groove between the apex of the petrous part of the left temporal bone and the great wing of the sphenoid on the left side. Its cartilaginous wall is deficient inferiorly. A probe passes through it into the osseous part at the angle of junction of the petrous and squamous parts of the temporal.
The Pharynx.
The upper part of the pharyngeal cavity is seen in this section. We note that the jaw has passed through the epiglottis immediately in front of the point at which the larynx communicates with the pharyngeal cavity. We note the form and size of the pharynx as seen in this section, we note also its muscular walls and the relation of it of the Eustachian tubes. The buccal becomes continuous with the pharyngeal cavity immediately above the epiglottis whilst the posterior part are at a higher level. The buccal and nasal openings into the pharynx were traced in the opposite side of the section from which this Plate was made. Inferiorly we note the cornu of the hyoid bone on each side and we also see the thyroid cartilage of the larynx divided vertically and a small part of the interior of the larynx.
Temporal, zygomatic, and pterygoid fossa.

On the right side we abol these fossa with some of their contents. On the left side we note the posteriad part of the temporal fossa with the temporal muscle and lying upon it the temporal artery and vein. On the right side we see the temporal muscle and also the pterygoid muscles the latter being in the pterygoid fossa. The zygoma is seen at section and below it is the inferior maxilla. A muscle passes between the two bones, which is the right masseter muscle.

On the inner surface of the inferior maxilla are seen the buccal artery and vein.
Case 6. Plate V

This Plate is a drawing made from a coronal section of the head immediately behind the tympanic cavities and through the odontoid process and body of the axis vertebra. The two sides of the section are very nearly in the same plane, the right side being only slightly anterior to the left, for on the right side the section shows the posterior wall of the tympanic antrum whilst on the left side it passes posterior to the tympanic cavity altogether.

The Bones of the Cranium.
Superiorly we note the meeting of the two parietal bones at the sagittal suture. Laterally and inferiorly the each parietal bone is seen to be attached to the temporal of the same side at the squamous suture. On the left side the section passes through the petrous
part of the temporal bone cutting into the cochlea internally and into one of the semicircular canals externally. A part of the internal auditory canal is cut and we note the junction of the petrous part of the temporal and the condylar portion of the occipital in front of the jugular foramen. The condyle of the occipital on this side rests freely on the ring of the atlas vertebra, which is cartilaginous. In the middle line is the foramen magnum divided in front of the transverse ligament. The section passes through the odontoid process of the axis as it lies in front of the transverse ligament. We note the centre of ossification in the odontoid process and also that at the body of the axis vertebra, cartilage intervening.

On the right side of the middle line, inferiorly we note the condyle of the occipital resting on the right side of the
ring of the atlas. The articular surface of the condyle slopes downwards and inwards and is cartilaginous. External to the ex-occipital on this side is the jugular foramen with all the commissure of the lateral venous sinus. External to it is the petro‐part of the right temporal bone, showing the posterior wall of the tympanic cavity. The semicircular canals near the junction of the superior and transverse, and also the cochlea.

The Brain.
The medulla oblongata is seen lying in the middle line at the foramen magnum. Superiorly and medially is the pons cerebri and the longitudinal fissure and below it is the corpus callosum and laterally are the lateral ventricles of the brain. The temporal-<s>sphenoidal lobes are also seen</s>.
The External Ear.
On the left side we note the helix and the anti-helix with the fossa of the helix and that of the anti-helix. We see also the concha and the anti-tragus.
The section spaces behind the lobule and behind the external auditory meatus. On the right side we see the concha and the anti-tragus and part of the lobule but here also the section is behind the external auditory meatus.
Below the ears are the muscles of the neck, the stern-cleido-mastoid and others. The septa between the various muscles are not, however, well seen.
On both sides we are behind the level of the internal jugular vein but on the right side we note a small part of the posterior wall of this blood-vessel.
Case 6. Plate VI

This Plate represents a transverse section made through the trunk at the level of the upper part of the 2nd sacral vertebra. The section is also somewhat oblique, the right side being at a higher level than the left. Further as the section passes transversely in the level of the upper part of the 2nd sacral vertebra it follows that posteriorly the pelvic cavity is opened into while anteriorly the parts seen, bladder &c., are above the symphysis pubis, therefore abdominal.

The Bones

The sacrum is seen posteriorly divided at the upper part of its second vertebra in the middle line, laterally on the right side the section is at a higher level passing through the right sacro-iliac synchondrosis and iliac bone.
above the anterior inferior iliac spine, on the left side the section is at a lower level passing as it does through the great sciatic foramen and iliac bone at the level of its anterior inferior iliac spine. The iliac spine is seen to be cartilaginous as is the exsterocondral and part of the sacral vertebra. We note also the sacral canal and its nerve contents.

The muscles:

Lying posteriorly to the iliac bones are the glutal muscles, whilst anteriorly are the psoas and ilioisch muscles. The muscles of the lower part of the anterior abdominal wall are also seen, but the septa between them could not be distinctly made out.

Lying behind the sacral bone is a fleshy mass made up of the fibres of the erector spinae and multifidus spinar muscles.
The intestines.

The rectum. A little to the left of the middle line, and posteriorly to it in transverse section, the first part of the rectum as it passes towards the middle line at a lower level. To the right of the rectum is seen a loop of the sigmoid flexure. The presence of a loop of the sigmoid flexure in the right lateral pouch of Douglas I have found to be a very constant condition in the infant both male and female, and in all cases I have carefully verified the condition by tracing the loops both upwards to the colon and downwards to the rectum. In this section it was easy to lift out the loop and so get a view of the pelvic cavity on the right side posterior to the right broad ligament of the uterus, lying behind the anterior abdominal...
wall and to the right of the bladder is seen a loop of small intestine (ileum), another coil is seen to the left of the bladder, whilst still another is seen to intervene between the bladder and uterus. All these parts of the ileum lay above the level of the brim of the pelvis.

The Bladder.

This viscus is seen in transverse section. Its walls are in contact, for it contains no urine. Note the thickness of the walls (3 mm. at parts) and the rugose character of the lining mucous membrane.

The cavity is oval in shape, the long diameter of the oval running nearly antero-posteriorly. The antero-posterior diameter of the bladder is 1.5 cm., and its transverse is a little over 1 cm. Behind the bladder and to the right side is the Fallopian tube.
The Uterus and Ovaries.

The Uterus, which appears nearly round on section, is divided just below its fundus. It measures 7 mm in diameter on the right side which it will be remembered is at a higher level. We note the convoluted Fallopian tube of that side with the divided ovary lying posteriorly to it. On the left side which is inferior we see only the lower part of the left broad ligament passing to the lateral pelvic wall. We shall have occasion to return to the relations of the uterus and the tubes and ovaries when describing the special drawing of the female figure with the left tube and ovary, but it may here be noted that in this section both the right Fallopian tube and right ovary lie anterior to the uterine, while to the right of the uterus is the loop of sigmoid flexure.
The Ureters.

Both the ureters were identified by the expedient of passing mercury through them into the abdominal cavity. On the right side the ureter is seen lying midway between the external and internal iliac veins at the base of the pelvis. On the left side, which is at a lower level, the ureter lies a little further back and is in close relation with the uterine wall. It lies between the internal and external iliac veins but to their inner side.

The Blood-vessels.

Anteriorly on each side are the external iliac artery and veins with the anterior crural nerve. Posteriorly are the internal iliac artery and veins, and the sciatic, internal pudic, and glutetial branches. The relations to each other of the external iliac artery, vein, and anterior crural nerve are well seen on the right side.
Case C. Plate VII

This Plate represents a vertical sagittal section through the pelvis. The urethral, vaginal, and rectal canals have all been opened into in nearly their whole extent. At the lower part posteriorly the section is slightly to the right of the middle line and therefore the anus has not been laid open.

The Bones:

Posteriorly the section passes through the 2nd, 3rd, 4th, and 5th sacral vertebrae, and then through the coccyx.

The upper part of the section is therefore at the level of the upper part of the body of the second sacral vertebra (see Plate VI). Anteriorly we note the cartilages of the symphysis pubis, this is situated 1.1 cm. below the upper border of the section. The symphysis measures 1.2 cm. in a
vertical direction, and has a transverse diameter at its widest part of 5 mm. 
The upper and lower ends of the symphysis are narrower than its middle. 
This is especially so with the lower extremity. As seen in this section 
the symphysis pubis runs downward 
with an inclination backwards but 
looking at it in relation to the 
plane of the brim its direction is 
almost vertical. A line has been 
drawn from the promontory of the 
sacrum to the upper border of the 
symphysis pubis and this line 
marks the antero-posterior diameter 
of the pelvis at its brim or inlet. 
The antero-posterior diameter at the 
brim (diameter conjugata vera) measures 
3 cm. (1/8 inch). A line has been 
drawn from the tip of the coccyx 
To the lower margin of the symphysis 
pubis and this marks the 
anteo-posterior diameter of the pelvic outlet.
This diameter measures 2.4 cen. (about 1/16 inch). If we prolong the two lines above mentioned it will be found that they meet at a point 1.2 cen. anterior to the symphysis. The length of the conjunctura sera is therefore 2 1/2 times greater than the distance in front of the symphysis at which the diameters at the inlet and the outlet of the pelvis direct one another. The vertical extent of the pelvic cavity at a point midway between the anterior and posterior walls is 2.7 cen. The antero-posterior diameter running between the anterior surface of the 4th sacral vertebra and the posterior surface of the symphysis at its middle a point midway between its upper and lower margins is 3 cen. We note that the bladder is an abdominal organ, and that the upper part of the uterus is also above the pelvic brim.
The Bladder.

Part of the bladder lies above the upper margin of this section. The viscous contained no urine and hence its walls are in close apposition. Its form is ovoid and its long axis runs forwards and upwards. It measures 2 cm in its long diameter, and 1 cm antero-posteriorly. It will be noted that the bladder in this case lies above the pelvic brim and is therefore entirely an abdominal organ, for a line joining the 1st spine of the sacrum and the upper margin of the symphysis pubis runs through the point of junction of urethral canal and vesical interior. The bladder is in contact in front with the anterior abdominal wall as peritoneum intervening, posteriorly in the uterus vesical pouch is a coil of intestine and part of the right Fallopian tube
The Urethra

The cavity of the bladder forms with the urethral canal a very obtuse angle. The urethra has a direction at first downwards and slightly backwards and then downwards and forwards and hence has a general anterior concavity. The urethra arises from the bladder at the level of the plane of the brim, and hence the length of the canal is considerable, namely 3.8 cm.

The meatus urinarius is situated immediately anterior to the vaginal orifice and hymen and under corn of the mons pubis and clitoris. In its course the urethra lies 4 mm. behind the symphisis pubis. The total length of the canal from meatus urinarius to vesical fundus is in this case 5.6 cm. (2.14 inches). In its course the urethra is very nearly parallel to the axis of the pelvis.
The Uterus.
The uterus is seen lying behind the bladder and in front. The section unfortunately does not show its entire extent, but a separate drawing has been made of the upper part which has been cut off and a description of such will be given later on. We note that the uterus has an oval form, its long axis running upwards and forwards.
It was impossible to differentiate between cervix and body as the space on the walls were not confined to one part but an idea of the size of the cervix was obtained from a consideration of the depth of the anterior and posterior vaginal fornices. The uterus measures nearly \( 1 \) inch in length (2.3 cm), whilst its antero-posterior diameter is 1 cm. Its direction is closely parallel with the axis of the pelvis. Part of
the uterus lies above the plane of the brim a fact which measures 1 cm in length. The uterus is not in close contact with the bladder at front for a coil of small intestine lies in the utero-vesical pouch. Posteriorly it is in close contact with the rectum in this plane. The anterior lip of the cervix seems to be shorter than the posterior. There are other facts regarding the position and form and relations of the uterus which will be more fully studied in a separate portion of this Thesis.

The Vagina.
The vaginal canal is laid open in all its extent except quite at its inferior extremity where the hymen is situated. The vagina is relatively long in account of the fact that the uterus is partly abdominal in position. The length from hymeneal orifice to os uteri externum is
3.5 cm. and if we include the depth of the anterior fornix it is 1 cm. more (4.5 cm or 1 3/4 inch). The upper part of the vaginal slit is nearly in a line with the cervical canal, it then bends slightly forwards, then backwards and then forwards again at its bulbar end. The upper end of the vagina is 1.2 cm behind the symphysis pubis. The general direction of the vaginal slit is downwards and forwards. The lower end of the vagina has not been cut and we note the somewhat prominent hymenoeal membrane, which projects in such a way as to cause the lower part of the vaginal canal to run almost antero-posteriorly. The anterior and posterior vaginal fornices are nearly of the same depth (1 cm), the upper end of the anterior fornix is only 2 mm below the plane of the brim of the pelvis.
The Rectum.
The rectum is seen lying behind the uterus and in front of the sacrum.
It is cut into in the greater part of its extent, but in the lower part
the section just passes the anod aperture being a little to the right
side of the middle line. The first part of the rectum which
passes towards the right side
is seen in cross section. This part
is attached to the sacrum by the
meso-rectum. Lower down the fluid
the rectum, divided in the line of
its long axis recurrencing downward
and forwards behind the vagina
and in front of the lower part of
the sacrum and the coccyx. It
then makes a curve and runs
downwards and backwards to
open on the skin surface at the
anus (vide Plate IX). The first
part lies in front of the 1st and 2nd
sacral vertebrae.
The Peritoneum.

The peritoneum anteriorly passes through the lowest part of the utero-ovarian pouch in the middle line. In this pouch is small intestine (small loop) and a small part of the ileum (vide Plate VI). The pouch of Douglas is seen to pass down to the level of the body of the 1st part of the sacrum, and corresponds in position to the os uterini. On the right side the right lateral pouch of Douglas was seen to be deeper and to contain a loop of sigmoid flexure but in the middle line it is not so deep and contains in this case the first part of the rectum with its meso-rectum. The lowest part of the utero-ovarian pouch is therefore seen to be above the plane of the bowel; the lowest part of the utero-sacral pouch is considerably below the level...
Case No. Plate VIII

This Plate represents the opposite side of the section shown in Plate VII, but an uncertain account of tissue was removed in the form of saw-dust and hence the two plates do not entirely correspond. Further as the upper margin of the section is a little higher on the right side of the body we see a little more of the upper part of the bladder and of the uterus.

From the close resemblance between this plate and the preceding one it will be unnecessary to give a full description of the parts seen.

In the oesophagus we note the specific centres in the 2nd and 3rd and 4th pieces. The bladder and upper part of the urethra are seen in section but lower down the section is to the right of the cervix.
we note the vaginal bulk of the right side and the right labium minus and majus. The same remarks hold with regard to the vaginal canal. We note a portion of the right Fallopian tube lying in front of the uterus in the utero-cervical pouch. We observe the first part of the rectum divided at the point where it passes from the left side towards the right in order to gain the middle line of the sacrum. The next part of the rectal canal lies a little to the right and is not cut into, but at the level of the 1st piece of the sacrum the rectum is again cut into. The third part is not seen as the section is to the right side of it. The pouch of Douglas is seen to be deeper in this plate than in plate VI, its lowest point being on a level with the 5th piece of the sacrum.
Case 6. Plate IX

This plate represents a vertical section of the pelvis in the sagittal plane drawn to the left of the middle line. We note the cartilaginous lateral portion of the 2nd, 3rd, 4th, and 5th pieces of the sacrum, but the coccyx is not seen at all. The first part of the rectum, lying in the left lateral portion of the retro-sacral pouch of peritoneum is seen, and it is to be observed that the lowest point of this pouch is on a level with the 3rd part of the sacrum. The left side of the body and cervix uteri are seen and also the left wall of the vagina and its rugae. The left side of the bladder is at the front, and anterior to it are the rectus and psoas muscles. Lower down is the left vaginal bulb and posteriorly is the left wall of the anal canal.
Case C. Plate X

This Plate is a drawing of the naked eye appearances of the external genital organs of the female child of which the above described frozen sections (Plates I-IX) were made. The labia majora and minora have been drawn aside in order that a view might be obtained of all the external genitals superiorly to seen the Mons Veneris, a cushion of adipose tissue lying in front of the symphysis pubis. Below it in the middle line is the clitoris, the erectile organ in the female. The anterior extremity of each labium minus is seen to divide into two branches at the level of the clitoris. The upper or anterior branch continues with that of the opposite side to form the prepuce of the clitoris. The prepuce in this case hides from view nearly completely the clitoris. The lower or
posterior division meets that of the opposite side below the clitoris and forms the frenulum of that organ. Below or behind the clitoris is seen a smooth triangular space known as the vestibule. The apex of this triangle is formed by the clitoris, the sides by the anterior portions of the labia minora, and the base is formed by an imaginary line drawn between the labia minora at the level of the meatus urinarius. The meatus lies at the middle point of the base of this triangular space. In this case the vestibule measures 1 cm. from apex to base. Immediately behind the meatus in the middle line is the small vaginal orifice with the hymen. In this case the vaginal aperture is very small, for the hymen is large projecting forwards somewhat as the form of the fringes of a glove. Ini
peculiarity in the form of the hymenal membrane is better seen on
Plate VII. Behind the hymen and in front of the fourchette is a
distinct little depression, the fossa navicularis. In this case the labia
minora seem to blend into the middle line posteriorly to form the fourchette.
Intermediary between the fourchette and the anal aperture is seen the
region known as the perineum.
In the middle line posteriorly to the
small anal aperture and it is to
be noted that in the child the
anus is not situated at the bottom
of a distinct groove between the
buttocks, for in the infant the
buttocks do not form the projecting
flabby masses that they do in the
adult, and the anus is, as in this
case, nearly flush with the surrounding
skin surface of the gluteal
regions.
On each side is seen a labium minus and a labium majus, and it is to be noted that in the adult the labium minus although much thinner than the labium majus has nearly as great an antero-posterior extent. Each labium minus lies to the inner side of its labium majus and has a smooth mucous membrane like appearance. In the natural state of the parts the labia minora are in contact, but in this case they have been drawn apart to reveal the underlying organs. Each nympha is seen to divide anteriorly into two parts which with those of the labium of the opposite side form the preputium and prepuceuclitonsides. Posteriorly the labia minora seem to blend in the middle line to form the fourchette. The vertical extent of each nympha is in this case 2 mm.
Externally to the labia minora are the labia majora. These structures also have been drawn aside, but in the infant they do not overlap the labia minora to the same extent as in the adult. They have the appearance of integument and very delicate little hairs can be seen on their surface. They are thicker than the mons veneris, but do not greatly exceed in them in antero-posterior extent. Anteriorly they seem to blend with the skin of the mons veneris, posteriorly they seem to merge with the perineum. Their antero-posterior length is nearly 3 cm.

It is to be noted that in this case there is no evidence of the presence of what Pozzi calls the male urothelial band, a structure to which we shall again have occasion to refer.
Case XI. Plate XI

In Case XI the upper part of the uterus was found surrounded by intestines in one of the blocks into which the abdomen had been divided. In order to display the uterine fundus with the tubes and ovaries the intestines were gently lifted off, so as not to disturb the relations of the parts and a sketch made of the structures thus brought into view. This Plate represents the parts thus displayed. The section passes on the right side in a plane a little in front of that on the left side and this has to be borne in mind in studying the position; still, after taking this into account it is evident that the uterine fundus, whilst being inclined forwards, has also a lateral thrust, the right upper angle lying anterior to the left. Further, the left ovary is seen lying posterior to the plane
of the uterus and its ovarian pedicle issue behind and in apposition with the posterior wall of the uterus. Further this ovary lies at a higher level in the abdomen than the uterine fundus for it will be remembered that the upper part of the uterus lay above the pelvic brim (vide Plates VII, VIII, and IX) and here in this plate the ovary lies in part above the uterine fundus. The left Fallopian tube passes outwards and slightly downwards towards the pelvic brim and makes an incomplete and several incomplete bends upon itself. The uterine end of the right tube is seen in this plate, but the rest of this tube and the right ovary are seen in Plate VI, q.v. The right ovary lies in a plane slightly anterior to the fundus uteri and the right Fallopian tube passes outwards forwards and downwards to the pelvic brim. The castration of the portion of the organs will be considered in Part II (Eutata Organs).
Case D.

Clinical Notes of Case D.

M.B., a primipara, 20 years of age, was delivered in the Royal Maternity on January 23rd, 1889, at 7.30 p.m. The child presented by the vertex in the O.Z. A. position, and the first stage of the labour lasted 8 hours, the second 1 hour, and the third stage half an hour. The child which was a male was still-born, and had the umbilical cord twisted once round the neck. The infant weighed 6 lbs. 14 oz., and the placenta 1 lb. 7 oz.; the length of the child was 19 1/2 inches and of the umbilical cord 24 inches. Dr. Hos. Watts Eden, one of the Maternity Residents, delivered the case.

The mother died two days after her confinement from gonorrhoeal peritonitis, ovaritis, and balanitis. (Note Maternity Record Nov. 1888 to Feb. 1889)
The following were the measurements of the infant's head at the time of birth.

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occipital-Mentalis</td>
<td>5 inches</td>
</tr>
<tr>
<td>&quot;</td>
<td>4 1/2 do.</td>
</tr>
<tr>
<td>Sub-Occipital-Bregmatica</td>
<td>3 1/4 do.</td>
</tr>
<tr>
<td>&quot;</td>
<td>3 1/2 ds.</td>
</tr>
<tr>
<td>&quot;</td>
<td>2 3/4 do.</td>
</tr>
</tbody>
</table>

The circumference in the occipital-mental plane was 14 inches, in the occipital-frontal 13 1/2 inches, and in the sub-occipital-bregmatic plane 11 1/2 inches.
Preparation of sections in Case D

The male still-born infant, termed Case D, was placed in a freezing mixture of ice and salt within 24 hours after birth. It was allowed to remain in the mixture for fifteen hours. At section, fifteen hours after death, transverse sections were made in the usual manner. The position whilst in the ice and salt was an extended one, the lower limits being extended, the chin drawn away from the sternum and the arms lying by the sides.

A series of vertical coronal and sagittal sections were made of the head, thorax, neck, abdomen, and pelvis, and one transverse section was made at the level of the upper part of the spine. The following drawings were made of the sections thus obtained.
I. Vertical Sections

a. Coronal
1. Section through anterior part of thorax and abdomen in front of the shoulder joints and of the stomach and duodenum. Plate I
2. Section through posterior part of thorax and abdomen at level of the shoulder joints and of the kidneys. Plate II
3. Section through head at the level of the orbits and posterior to the eye-balls. Plate III
4. Section through head at the level of the external auditory canals and tympanic cavities. Plate IV

b. Sagittal
1. Section through pelvis in middle line of body. Plate V

II. Transverse Section
1. Section through body at the level of the base of the sacrum. Plate VI
Case D. Plate I

This Plate is a drawing of the parts seen in a coronal section of the thorax and abdomen in a plane anterior to the shoulder joints. The section is viewed from behind and it will be noted that the left side of the body is somewhat anterior to the right, the cut having been made obliquely from left to right.

The Thorax.

Superiorly we note the manubrium sterni divided obliquely so that on the right side of the body we see the sternoclavicular articulation whereas on the left side the line section is in front of it.

On the left side we observe the costal cartilages of the 8 upper ribs, on the right side the ribs themselves have been divided for the section is on
a deeper plane on the right side. The intercostal spaces measure from 6 to 4 mm.

The vertical extent of the thorax in the middle line is 3.8 cm; on the right side it is 3 cm; and on the left side 3.5 cm. The transverse diameter of the thorax at the level of the 1st rib is 3.5 cm, at the level of the 2nd rib 5.3 cm, at the level of the 3rd rib 6.5 cm, and at the level of the 5th rib 7.6 cm.

The diaphragm is seen forming the floor of the thoracic cavity, and it is to be noted that it is situated higher in the body on the right side. On the left side the thoracic cavity extends down to the level of the 8th rib, whilst on the right side it reaches only to the 5th rib, but it must be borne in mind at the same time that this side is more posterior. The large right lobe of the liver seems to have pushed the diaphragm upwards on the right side.
The Spleen Gland.

This structure is seen lying behind the sternum and in front of the right auricle. Its large size is to be noted for it extends downwards to the level of the interpace between the 3rd and 4th ribs. It lies very nearly in contact with the diaphragm, but then in this case the latter structure has been displaced upwards by the distended bladder and by the large liver.

At the upper border of the spleen there is an indication of a fissure dividing it into two lateral masses.

In this plane the spleen is seen to lie in contact on the right side with the lung, on the left side with the heart, and for a small distance with the left lung, and posteriorly it is in contact with the pericardium covering the anterior surface of the heart. Its vertical diameter is 3 cm, its greatest transverse is 2.5 cm.
The Heart and Pericardium.

In this section only one chamber of the heart has been opened into, and that is the right auriculae; for the cut has simply passed through the wall of the right ventricle. We are looking into the right auricle from behind and we note the plication of its wall. It was full of red blood clot but this was removed in order to display the wall. The apex of the heart in this section is opposite the lower margin of the 5th costal cartilage. The pericardial sac extended downwards nearly to the level of the 6th rib and was found to contain a considerable amount of sanguinolent fluid. There is seen to be a distinct impression upon the diaphragm at this spot where that muscle lies beneath the heart. The diaphragm serves moulded to the surface of the heart and pericardium.
The Right Lung

On the right side we have a view of the right lung in section. It has a triangular shape with its apex at the 1st rib and its base moulded to the upper surface of the diaphragm. Its inner margin which is divided at a point considerably in front of the root is in contact with the thymus gland. Its outer border is in contact with the pleura and through it with the thoracic wall from the level of the 1st rib to that of the 5th.

We see no part of the left lung in this section for the saw has passed in a plane anterior to it. At the level of the 5th and 6th intercostal spaces on this side we note that the anterior part of the left pleural cavity has been opened wide; it contained serous viscid fluid. On the right side the lung is in contact with the pleura.
The Abdomen.

In the abdomen we find that the organs which fall to be described are the liver, the colon, the small intestines, and the bladder. This section passes anterior to the stomach and duo-
denum.

The Liver.

This organ is voluminous and we can describe a superior, a left inferior, and a right border. The superior surface of the diaphragm and is viscus, the right lobe lying higher than the left. The left lobe, further, seems to be compressed downward by the overlying heart and pericardium. The left inferior border is directed downwards and towards the right side. We note as in the fossa for the gall-bladder containing that structure.
hepatic border is in contact with the small intestines, in the middle line and on the right side the transverse colon and hepatic falciform ligament is in contact with it. The margin measures 10 cm. from left to right.

The right border is the abdominal wall. The opening of the umbilical vein is seen in the middle line of the body and 6 cm. above the point of insertion of the umbilical cord. It contains much blood clot, and on removing the intestines a flat form blood clot is seen lying in the umbilical vein as it passes upward on the posterior surface of the anterior abdominal wall immediately above the navel. The opening of hepatic vein are also seen both in the left and right hepatic lobes.
The Colon.
Immediately below the gall bladder the transverse colon is seen to make a sharp bend upon itself, it then passes to the right side and there we notice another bend, the hepatic flexure. Part of the ascending colon is seen on the right side, and part of the descending on the left side. The other parts of the colon are on a plane posterior to this section. The colon is much distended with the green meconium.

The Small Intestine
This section occurs anterior to the duodenum, but we note the coils of jejunum and ileum lightly inferior to the left lobe of the liver next to the transverse colon and above the fundus of the distended bladder.

The level of the umbilicus is marked in this Plate by a star *, the blood clot in the vein is immediately above this.
The Bladder.

Only the upper part of the bladder is seen in this Plate. It is much distended with urine for its fundus reaches to a point immediately above the umbilicus, as marked by the star *. In its anterior wall there is seen to be a distinct ridge.

In order more fully to bring out the relations of the parts in this section I have appended a pen and ink sketch of the opposite side. This sketch will be found on the following page and represents the parts as seen from the front. It will be remembered that the section is on the right side in a plane posterior to that of the left side and hence the thoracic walls are divided at a different level.
on the two sides of the body.
Let us look at some of the points...
In this sketch.

In the thoracic region we note that the thin slice removed from the manubrium sterni has fallen out of its place. On the right side which is at a deeper level we note the clavicle and the lateral portion of the sternum. On the left side the clavicle is seen but not the ribs, and we note the side of the sternum on this side also. On the right side nine ribs are seen divided, these correspond to the ribs seen in Plate I; but, as the 9th is cut into at its most anterior point in this sketch, it is not visible in Plate I. On the left side eight ribs are seen cut through in some cases at their junction with their cartilages, in others divided in the region of the cartilages themselves. In the middle line the vertical diameter of the thoracic cavity is seen; it is greater on the left side and less on the right. This difference in the
Vertical measurements are due to the fact that the diaphragm is at a higher level on the right side than on the left. The thymus gland is seen lying above the right auricle, its appendix, and above the right ventricle. Its right border is in contact with the right pleural sac. Its measurements are the same as in Plate I.

The heart has its right auricular and ventricular chambers opened wide. Both these cavities contained blood clot, but on recovering this the various parts are seen. Thus in the right auricle we note the foramen ovale which forms the means of communication with the left auricle and immediately below it is the thin Eustachian valve. Above the foramen ovale is a slight prominence, the so-called "intercle of casino," and above that is the opening of the superior vena cava. Immediately below
the Ostachian valve is the opening of the inferior vena cava. The vena cava itself lies in a plane posterior to that seen in the section.

The tricuspid orifice which is the opening from the right auricle into the right ventricle is very well seen in this section, and we note the septat valve with its chordae tendineae and papillary muscles. At the upper part of the right ventricle is the commencement of the pulmonary artery, but this is not seen as the section at this point runs anterior to it. Between the auricle and ventricle superiorly is seen the right auricular appendix. The cardiac apex is seen to be opposite the 6th rib and we have to note the pericardial sac surrounding the heart. The pulmonary orifice is at the level of the 2nd intercostal space.

The anterior margin of the left lung is seen below the apex of the heart.
and its narrow border can also be seen higher up in the region of the 2nd and 3rd intercostal spaces.

The right lung is seen in vertical section, and we again note its triangular shape and also observe the appearance of the anterior part of the lower lobe and the commencement of the fissure which separates the upper from the middle lobe. The bronchus descends to the level of the 6th rib.

In the abdominal cavity the largest organ seen is the liver. We note its right, left, and quadrate lobes, and also see the longitudinal fissure and umbilical vein, and the fissure for the lodgment of the gall bladder. The vertical diameter in the region of the right lobe is nearly 5 cm, in that of the quadrate lobe it is 3 cm, and in that of the left lobe 2 cm. Its transverse measurement at the level
of the umbilical vein is 9.5 cm. Its upper border is moulded to the lower, surface of the diaphragm and tapers downwards and to the left. The left inferior surface of the liver is seen lying in contact with the transverse colon, the stomach and its pylorus and the beginning of the duodenum.

The stomach is not opened wide in this section, but its anterior wall is seen lying behind the lower border of the left lobe of the liver, and the pyloric end and commencement of the duodenum are seen inferior to the quadrate lobe.

Several facts of the large intestine are seen. On the right side we note the ascending colon, the hepatic flexure and the beginning of the transverse colon, whilst in the middle line we see the transverse colon making a bend upon itself and passing to
the left side, where lies the splenic flexure and descending colon. The colon is much distended with moco-
rum. (vide Part II Chapter V on splenic flexure etc.)

Loops of small intestine fill up the rest of the abdominal cavity and at the lower part is the fundus
of the distended urinary bladder.
Case D  Plate II.

This Plate gives a representation of the parts seen in a coronal section through the neck, thorax, and abdomen, at the level of the trachea in the neck, of the shoulder joints in the thoracic region, and of the kidneys in the region of the abdomen. The left side of the section is at a level a little anterior to that of the right side as is seen by the fact that on the right side we are posterior to the humerus. The section is therefore slightly oblique.

We shall look at the structures seen in the neck, thorax, and abdomen, and shall describe them in their order from above downwards.
Region of the neck.
The neck is cut through in the region of
the body of the third cervical vertebra,
and the coronal section passes downwards
in the plane of the trachea.

The Larynx and Trachea.
At the upper part of the section we note the
lower part of the laryngeal cavity with
the cricoid cartilage, which is so divided
as to show the two sides of the ring
immediately in front of their junction latera-
larly. The pharynx and the beginning of
the oesophagus lie behind and a little
to the left of the larynx and their
position is indicated by a star *.
The trachea passes downwards from the larynx
into the thorax, and we note that its
vertical extent from the laryngeal end
to the point of bifurcation into the two
bronchi is 4 cm. At the upper part of
the neck the section passes a little behind
the tube, but in the lower part of
the neck, and in the thorax its cavity
is fairly laid open. Its diameter varies slightly, being at some parts 1.5 mm at others 2 mm. The point of bifurcation is seen to be at the level of the third rib, and also corresponds with the point on the right side at which the vena azygos major bends over the root of the right lung. On the left side of the trachea we note the left common carotid artery and higher up it is bounded laterally by the right and left thyroid lobes.

The Thyroid Gland.

To note in this plate the two lateral lobes of the thyroid body, the section being in a plane posterior to the isthmus. They lie at the sides of the larynx and upper part of the trachea. The left lobe seems larger but this is due to the obliquity of the section. The left common carotid artery is seen as it lies in the neck and upper part of the thorax. At the
upper part of the neck it lies behind the thyroid gland and is therefore not cut into, but lower down it is seen running to the outer side of the trachea and having the left internal jugular vein to its outer side. Of the right carotid artery we see only a small part for the section runs slightly posterior to the plane in which it lies. The part seen is that where it passes under cover of the right lobe of the thyroid at the level of the cricoid cartilage.

The internal jugular vein on the left side the upper part of the vein is not seen as it lies in a slightly deeper plane, but it becomes visible near the point where it joins the left subclavian vein to form the left innominate vein, and since this last named vessel crosses over the left carotid artery to pass to the superior vena cava we do not see it in this section. On the right...
side the upper part of the right internal jugular vein is the only portion of it which has been cut into. The artery (right Carotid) lies to its inner side and was found on the opposite side of this section.

On both sides we find that the shoulder joint has been opened into. On the left side we observe the humerus with its head lying surrounded by fluid (Synovia) within the capsule. Ligament of the joint. Above the head of the bone and to its inner side is the tip of the coracoid process, and higher and nearer the middle line is part of the left clavicle. The acromion process is deeper on the right side the section passes through the posterior part of the right shoulder joint, and we note a small part of the head of the bone as it lies in the glenoid cavity of the scapula. The right acromion process and right clavicle are seen above the joint.
Region of the Thorax.

On the left side ten ribs are seen in section, and on the right side eleven. The section passes behind the root of the right lung and immediately in front of the root of the left.

The vertical diameter of the thorax in the middle line is 5 cm, on the left side 4 cm., and on the right side 4.8 cm. Its transverse diameters are:

- at level of 1st rib: 4 cm.
- 2nd: 5.3 cm.
- 3rd: 6.1 cm.
- 4th: 6.7 cm.
- 5th: 7.1 cm.
- 6th: 7.5 cm.
- 7th: 8.0 cm.

The intercostal spaces measure vertically from 5 mm to 3 mm., and on the right side some measure only two millimetres.

The diaphragm or floor of the thoracic cavity is divided in the plane
of the hiatus aorticus, a foramen which lies in front of the vertebral column, is bounded by the diaphragmatic crea and transmits the aorta, the vena azygos major and the thoracic duct. The right side of the diaphragm is at the level of the 9th rib, the left side is at the level of the 7th rib, but then it must be borne in mind that the section is more anterior on the left side. The section passes immediately posterior to the oesophageal opening in the diaphragm. On the thoracic surface of the diaphragm we note the bases of the lungs and on the abdominal surface the left and right hepatic lobes lie in contact with it.

Entering the thorax at its upper part are seen the Trachea and left common carotid artery, whilst the apices of the lungs and part of the thymus gland pass upwards through the upper thoracic aperture.
The Heart.

In this section we note that the left auricular cavity, which contains blood clot, has been opened into. A small portion of the wall of the left ventricle is also seen. On removing the blood clot the opening of one of the left pulmonary veins is seen in the posterior wall of the auricle, and at its upper part is the orifice of the other. Above the auricle is seen the left pulmonary artery and above it the aorta divided close to the point at which it gives off the left common carotid and left subclavian arteries and at which it turns downwards in the descending thoracic portion of its course. Also lying above this part of the left auricle but on a plane superficial to the vessels is the commencement of the right bronchus. The oesophagus and descending aorta lie posterior to the heart.
The Oesophagus.

The oesophagus is divided at the point where it bends slightly to the left side and becomes more superficial in order to pass through the diaphragm and reach the cardiac end of the stomach. Its connection with the stomach is not seen in this plate.

The Trachea.

This structure has already been traced in the description of the structures seen in the neck, and no further mention is necessary.

The Thyroid Gland.

A small portion of the left lobe of the thyroid gland is seen lying above the left lung and resting upon the arch of the aorta and the vessels which rise from it. On the right side a part of the right lobe is seen in the region of the neck.
The Lungs.
The right lung is divided in this section immediately behind its root, and we note the three lobes into which it is divided, and the two fissures which serve to subdivide it. This lung extends upwards in the neck to a point 3 or 4 cm. above the first rib whilst its lower margin is opposite the 9th intercostal space. Its vertical diameter is 5.5 cm., and its transverse varies from 3 cm. at the lower part to 2.5 or 2.3 cm. nearer to its apex. Running along the inner margin of this lung is the vena azygos major. We see only a portion of the left lung as the heart lies superficial to it and the thymus gland covers its apex. We note the two lobes into which it is divided, and observe that its lower margin is base is in contact with the diaphragm at the level of the seventh intercostal space.
Its upper border in this section reaches almost as high as the 1st rib. The note at its root the left pulmonary artery, the left bronchus, and one of the veins. The artery is seen to lie above the bronchus on this side, and the veins become lower than either of those structures. The vertical extent of this lung is 7 cm, and the transverse diameter of its base is 3 cm.

Vena Azygos Major.

This vein, which arises in the lumbar region, passes through the aortic opening in the diaphragm on the right side of the aorta, then passes upwards along the inner margin of the right lung, being superficial to the intercostal arteries, and receiving numerous branches and the lesser azygos, and finally it turns forwards over the root of the right lung to join the vena cava superior, and so reach the right auricle.
The Region of the Abdomen

In this section we have to consider the liver, spleen, stomach, kidneys, suprarenal capsules, the colon, part of the small intestine, the muscles, bloodvessels, and part of the vertebral column. Superiorly the section, in this region, passes anterior to the aorta and vertebral column, but lower down it takes a slice off the spine in the region of the lumbar vertebrae and of the sacral promontory. The section is slightly oblique in the abdominal as well as in the thoracic region, the left side being in a plane slightly anterior to that in which the right side lies.

At the lower part we note the iliac bones and crests and also the right sacro-iliac synchondrosis, the cartilaginous surfaces of which are well seen. The left side is at a level about the synchondrosis.
The Liver.

On the right side we see the posterior part of the right lobe of the liver a part measuring transversely at its upper part 2.5 cm., and having a somewhat triangular shape. The base of the triangle looks downward and to the left side and is in contact above with the supra-renal capsule and lower down with the right kidney. It also lies in contact with the right crus of the diaphragm above the level of the right adrenal. Its upper and right borders lie in contact with the right side of the diaphragm and with its attachment to the ribs. The liver in this plane extends as low down as the eleventh rib.

On the left side only a small part of the left lobe of the liver is seen and as this side is anterior to the right it follows that the liver does
not extend nearly so far back on the left side of the body as on the right. The portion seen measures 2.5 cm. transversely and 5 mm. at its greatest vertical diameter. It is wedged in between the upper border of the cardiac end of the stomach and the lower surface of the diaphragm. Its inner side is the left diaphragmatic crus, and immediately below its outer border is the tip of the anterior crenated margin of the spleen. It lies at the level of the 7th intercostal space and of the 8th rib on this side.

The Spleen.

Only a small part of the spleen is seen in thin, the bulk of the organ lies on a deeper plane. The salt cut through in the anterior border near its lower end. It measures 1.5 cm. vertically, 5 mm. transversely, and is bounded above by the diaphragm, below
by the splenic flexure of the colon, and externally by the 8th intercostal space and by the 8th and 9th ribs. Below the stomach are seen the splenic artery (branch of coeliac axis) and the splenic vein, the artery lying a little above the vein. These vessels lie behind the pancreas, which is therefore anterior to this section, and pass behind the splenic flexure of the colon to the splenic flexure of the stomach.

The stomach, whose walls are seen not to be in contact with one another is cut through just behind the point at which the oesophagus enters it. It has, therefore, a real cavity, and it measures 3 cm transversely and 2 cm vertically. Its walls have a pale pink colour and its cavity contained watery mucous. The internal mucous membrane was thrown with numerous folds. The stomach in this plane lies below the left
lobe of the liver and upper part of the left side of the diaphragm, so the inner side of the spleen, above the commencement of the splenic flexure of the colon, splenic artery and vein, and left supra-renal capsule, and to the outer side of the left pillar of the diaphragm.

The Kidney.

On the right side the kidney is divided behind its attachment to pericardium and diaphragm, and we ask that it is surrounded by the renal adipose tissue. It measures vertically 3.8 cm and transversely at its upper part 2.5 cm, lower down 1.7 cm. It lies opposite to the lower part of the last dorsal vertebra, to the disc between it and the first lumbar vertebra, and to the three upper lumbar vertebrae and upper part of the body of the 4th lumbar. Between the kidney and the vertebral column there intervene however, the
right pillar of the diaphragm and the psoas muscle of the right side. It is bounded above by the perirenal capsule of the same side. Extensively it lies close to the muscular abdominal wall, the 11th rib being opposite to its upper border. Its lower border lies 8 mm. above the right iliac crest. The infundibula of the pelvis of the kidney are laid open, and we note the distinction between the cortical substance and the pyramids of Maldighi.

On the left side, the kidney is divided in a plane a little anterior to that on the right side. The renal organ is divided at the level of the hilus. The ureter being seen, but the vein and artery lie superficially. The kidney measures 3.5 cm. vertically and about 2 cm. transversely. It lies opposite to the 1st, 2nd, 3rd, and upper half of the 4th lumbar vertebra; the left pillar of
the diaphragm, and the left psoas muscle intervening. Above it lies in contact with the adrenal body, externally it is in contact with some coils of small intestine and at a deeper level with the descending colon, whilst its lower end lies above the commencement of the sigmoid flexure.

The Splanchnic Nerve:
The right splanchnic nerve lies above the kidney and has a triangular form. The base of the triangle rests on the upper end of the kidney, the outer surface, which has a furrow in it, is in contact with the lower border of the right hepatic lobe. The upper border lies along the margin of the pillar of the diaphragm, and the apex, which is rounded, fits in between the liver and the diaphragmatic crus. It measures vertically 1.2 cm, and transversely at its base 1.6 cm.
left suprarenal capsule is divided in a plane anterior to the right. We note its triangular shape. The base rests upon the upper end of the left kidney. The upper border lies in contact with the crus of the diaphragm and the outer edge is in contact above with the stomach and lower down with the splenic artery and vein. It measures 1.5 cm transversely at its base, whilst its vertical measurement along its upper border is 1.3 cm.

The small intestine

Two or three loops of the small intestine are seen on the left side wedged in between the outer border of the kidney and the descending colon. They represent that part of the small intestine which is situated most posteriorly in the abdomen, and in appearance are easily distinguished from the distended large intestine.
The Large Intestine.
In this plate we see only the descending colon at its upper end, the splenic flexure and at its lower the commencement of the sigmoid flexure. The upper part of the bowel seen in the drawing communicates directly with the lower part, but in the greater part of its course it is covered by another fold of large intestine. To this peculiarity in the arrangement of the splenic flexure and descending colon which I have also found in other new-born children, I shall have occasion to refer in detail later on. The large intestine contains a large quantity of dark green meconium. The diameter of the gut varies from 1 cm to 1.5 cm. In the greater part of its extent it is in contact with the external abdominal wall, and at its lower end its close to the left iliac crest.
the aorta.

I must in this Plate, that the aorta is cut through immediately below the point where it pierces the hiatus aorticus. The greater part of its course is not seen in the section but runs posterior to it.

The splenic artery and vein are to be noted as also the commencement of the vena azygos major.

Between the aorta and the last named vein lies the thoracic duct.

The vertebral column.

A slice has been removed from the anterior surface of the spine in the region of the lumbar vertebrae and of the sacral promontory.

The muscular cord of the diaphragm the psoas magnus muscle on each side, and the glutæi and muscles of the abdominal walls are also seen in this preparation.
The above sketch represents the opposite.
side of the section shown in the preceding plate, and is useful in enabling one clearly to understand the relation of parts.

In the neck we see the ring of the cricoid cartilage and the anterior wall of the trachea. The two lobes of the thyroid are seen the isthmus lying in front of the trachea. In the neck the aorta opened wide at the point where the innominate artery arises from it. The course of the innominate artery and of its branches was traced by means of a probe and is marked by the dotted lines.

The right lung is seen in the greater part of its vertical extent and we observe the pulmonary vein at its root and the vena azygos major passing over the root to join the superior vena cava. Above the heart on the left side is part of the left lobe of
The thymus gland and internal to the gland is the opening of the pulmonary artery. Only the outer border of the left lung is seen wedged in between the heart and chest wall. The left ventricular wall of the heart is cut into but the chamber itself is not opened. Nearest the middle line is the cavity of the left auricle with the foramen obale and the central orifice. Above is the left auricular appendage.

The inferior vena cava is cut into at the point where it passes from the right auricle to the diaphragm. In the abdomen we note part of the right lobe of the liver with under-lying it the right supra-renal capsule and the kidney. On the left side is a small part of the left hepatic lobe, the stomach and commencement of the oesophagus, the left supra-renal and kidney, and the descending colon.
The abdominal aorta is seen cut across at the level of the upper border of the kidney. It then lies deeper (i.e. more anterior) in this section. The slice taken from the bodies of the lumbar vertebrae is seen in the middle line.

On the right side the head of the humerus is seen in the glenoid cavity of the scapula, and above it is the junction of clavicle and acromion at the acromio-clavicular joint. On the left side the shoulder joint is divided more anteriorly, and we note the head of the humerus, the coracoid process of the scapula, and the left clavicle.
Case D. Plate III

This Plate represents a coronal section of the head in a plane which passes through the orbits immediately posterior to the eye-balls. The section is seen from behind.

We have to observe in order the cranium and brain, the orbits, the nasal fossa, and the mouth, tongue, and upper and lower jaws. This Plate closely resembles Plate III (Fig. 2) in Symington's Atlas.

The Cranium

The section passes vertically through the frontal bone and its orbital plates. Superiorly we note the frontal suture and underlying it the superior longitudinal venous sinuses. Laterally the frontal bone on the left side is divided through its external angular process on the right side the section is a little behind it. The orbital plates are divided anterior to the
cortex which passes between them and the sphenoid. In the middle line is the ethmoid bone with its descending perpendicular plate which passes down into the nose. The brain is divided in the region of its frontal lobes, and we note how it lies moulded upon the upper surface of the orbital plate. In the middle line superiorly is the longitudinal cerebral fissure with a portion of the false cerebrum lying in it.

The vertical diameter of the cranium in this plane from frontal sinuses to the ethmoid bone is 5 cm, the transverse at the level of the orbital plates is 6.5 cm and at a point 2.5 cm. above the orbital plates it measures 5.8 cm. The cranial vault from the orbital plate on one side to that on the other measures 13 cm and is therefore twice as much as the transverse diameter.
The Orbits.

The roof of the orbits is seen to be formed by the orbital plate of the frontal bone, the floor by the orbital plate of the superior maxillary bone, the outer wall by the maxilar bone, and the inner wall by the sphenoid of the ethmoid. On the right side which is slightly posterior to the right the orbital plate of sphenoid is seen and external to it is the root of the zygomatic process of the temporal bone.

At the upper and outer parts of the orbit is seen the lachrymal gland. The remaining space in the orbit is at this level, filled with fat, muscles of eye-ball and upper eyelid, and with the optic nerve. At the upper part of the orbit are the levator palpebrae superioris and superior rectus muscles seen in transverse section. On the inner wall are two muscular slips, the
upper one of which is the superior oblique, the lower, the internal rectus. Near the floor are also two muscles, the inner one is the inferior oblique, the outer is the inferior rectus. On the outer part of the orbit is the external rectus alone.

On the left side the optic nerve is divided as it lies 8 mm from the external rectus, 2 mm distant from the internal rectus, and 3 mm from both the superior and inferior rectus. On the right side which is in a posterior plane the muscular slips are more closely to the optic nerve. On the left side, therefore, the optic nerve lies nearer to the inner and upper wall of the orbit, whilst on the right side which is posterior it is more nearly central in position.

We have to note the large quantity of adipose tissue which forms the pocket for the eye-ball and surrounds the optic nerve.
The Nasal Fossae.

The meatuses of the nose are laid open on both sides. We observe the perpendicular cartilaginous plate of the ethmoid forming the septum, and being covered by mucous membrane (Schneiderian). On each side we note the three meatuses; inferior, middle, and superior, and on the right side there is also an indication of a fourth meatus lying above the superior. We observe the turbinated bones and the nasal mucous membrane covering them.

The anterum of Highmore, lying in the superior maxilla, is seen outside the inferior turbinated bone, and is small in size.

The alveolar process of the superior maxilla of each side is seen to form the floor of the nasal fossae in this plane. We note a tooth germ on each side.
The mouth and tongue

There is no real buccal cavity as the dorsum of the tongue is in contact with the palate and gums. The tongue is divided vertically through its root and we note in the middle line the geniohyoid and genioglossus muscles and to the outer side the omohyoid muscles. The tongue measures 2.8 cm transversely, and 1.2 cm vertically in the middle line. Under the tongue on the right side is a small cyst, probably connected with the sublingual gland of that side. The lower jaw is divided on both sides of the middle line and we see in it tooth germs.

The eulking pads, one on each side external to the buccinator muscles are well seen in this case. They measure 2 cm vertically and 1.5 cm in a transverse diameter and are quite separate from the surrounding fat.
Case D. Plate IV

This Plate is a representation of a coronal section through the head in the plane of the ears. The section is seen from behind and the right side is very slightly posterior to the left, for on the right side only a small part of the internal auditory meatus is opened into whilst on the left side it is laid open in nearly its entire extent from concha to tympanic membrane.

The Cranium.

Superiorly we note the sagittal suture running between the parietal bones and at the sides above the level of the ears are the squamous sutures between the parietals and the squamous portion of the temporals. At the lower part of the section is the base of the cranium made up, in this plane, of the
basi-sphenoid (behind the posterior clinoid processes), and of the petrous part of each temporal bone. The cranial vault measures 20 cm, and the base 8 cm. The thickness of the parietal bones is a little over 1 mm.

The Brain:
The cerebrum and pons varolii are divided coronally in this section, and we note in the middle line superiorly the longitudinal fissure of the cerebrum containing the falk cerebri. Below this fissure is the corpus callosum and the fornix and on each side the lateral ventricle. Lower down in the middle line is the 3rd ventricle and laterally are the descending horns of the lateral ventricles with the choroidal arteries. Resting on the basi-sphenoid is the pons varolii immediately in front of the commencement of the medulla oblongata. In the middle line lying upon
The bone is the basilar artery. At a level 2 cm. above the squamous
region is the anterior end of the
Sphenoid fissure, and below this
fissure is the temporo-sphenoidal
lobe of the cerebrum.

The Ears.

The Pinna, on each side, is seen cut
through vertically, and we note the
helix, concha, antitragus and lobule.
On the left side the external auditory
meatus is cut open in all its extent
except at the point where it becomes
continuous with the concha. From
its outer end to the menibrana
tympani the canal measures along
its upper wall 19 mm. and along
its lower wall or floor 21 mm.
At the outer part of the canal we
see a small part of fibro-cartilage
in its floor and at its inner
end is seen in section the ring
of the tympanic bone near which...
is seen the left internal carotid artery. The tympanic membrane runs down-
wards and inwards. Attached to the membrane is the handle of the
malleus. On this side, the incus on section, but this specimen is in front of the stapes.
On the right side the internal auditory meatus is cut into only near its
inner end, but we see all the tym-
panic ossicles. The manubrium of
the malleus is seen attached to the
tympanic membrane, the rest of the
malleus lies anterior to the incus
which hides it, and we observe the
incus articulating by means of its
lenticular process with the head of
the stapes. The base of the stapes
is seen fitting into the fenestra
ovalis and on tilting the handle
of the malleus towards the incus
and stapes are seen to pass toward
this fenestra. On this, the right,
side we see also a small part of
the tympanic ring inferiorly, and
we also see on this side the opening
of the internaly auditory meatus
with the auditory nerve lying in it.
The neck.
Below the basi-sphenoid, which is divided
close to the cartilage joining it to the
basi-occiput, is the anterior border
of the odontoid process and below
it the body of the axis vertebra.
At the sides we see the lateral part
of the ring of the atlas.
The parotid glands are seen at
the level of the lobules of the
cars and internal to them we
find a small part of the
internal jugular veins.
This Plate closely corresponds with Fig.
1, Plate IV of Symmington's Atlas
of the Anatomy of the Child, and
the two may be usefully compared.
Case D. Plate V

This Plate represents a vertical sagittal section through the pelvis of the still-born male child, termed Case D. Posteriorly the section closely follows the middle line, anteriorly it inclines to the right side for we find the right pubic bone cut into. The upper margin of the section is at the level of the 2nd piece of the sacrum.

The Bones

The 2nd, 3rd, 4th, and 5th pieces of the sacrum are been divided vertically in the middle line, and lower down is the coccyx. In front the right pubic bone is divided immediately to the outer side of the symphysis. Lines have been drawn marking the inlet and outlets of the pelvis. The antero-posterior diameter of the birth is 3 ccm, of the outlet 2 3 ccm.
The Bladder.

The Bladder, which was distended with urine, lies above the plane of the pelvic brim with the exception of a portion of the trigone. The viscus has been divided a little to the right of the middle line and we therefore get a view of the trigone with the opening of the left ureter. The right ureter is seen as it pierces the bladder wall and the orifice of the urethra is not seen, but the course of the urethra is indicated by the dotted line. The antero-posterior diameter of the bladder was 2.3 cm and its entire vertical diameter (cf Plate I) was 3 cm.

The Prostate gland is divided through its right lobe and is seen lying posterior to the symphysis pubis. It has a somewhat oblong form, and a vertical diameter of 1.14 cm. Its antero-posterior extent is 5 mm.
The Rectum.

We see in this drawing nearly the entire extent of the rectum. In the first part of its course it is seen to follow the curve of the sacrum downwards and backwards. It then faces downwards and forwards, and finally turns backwards to become continuous with the anus. We note the folds of the mucous membrane of this part of the gut, and especially the longitudinal ridge in the lower part above the anus, which is one of the columnae recti of Morgagni lying in front of the rectum in the recto-vesical pouch is a coil of the sigmoid flexure, a point which has several times noted. The posterior pouch of peritoneum descends as low as the lower border of the 4th piece of the sacrum in the middle line. Anteriorly are the penis and scrotum, which have not been cut into.
Case IX: Plate VI

This Plate is a representation of a transverse section through the lower part of the trunk at the level of the 3rd piece of the sacrum posteriorly and in a plane 2.5 cm. above the upper margin of the symphyseal pubis anteriorly.

The Bones.

Posteriorly and in the middle line we see the osseous centre in the 2nd piece of the sacrum, the sacral canal the framework of which is cartilaginous in its posterior part, and at the sides the articulation of the rump of the sacrum with the iliac bones at the sacro-iliae synchondrosis. The rode also the iliac bones running outwards and forwards to end in tips of cartilage. In front of each synchondrosis is the beginning of the sacro-lumbar nerve.
The Bladder

Anteriorly we note the distended urinary bladder, extending more to the left side of the middle line than to the right. Posteriorly it measured 2.5 cm, transversely nearly 3.5 cm. The ureters are seen passing down close behind the bladder and on the inner side of the external iliac vessels on the right side of the bladder is the lower part of the peritoneal cavity, which was found to contain frozen peritonitic straw-coloured fluid. On the left side of the bladder the peritoneal pouch contains a coil of intestine distended with meconium.

The Intestine

Besides the coil of intestine above mentioned we find lying behind the bladder and in front of and to the left side of the rectum a coil of the sigmoid flexure, which here,
therefore, forms a pelvic content to its outer side are the external iliac vessels and ureter on both the right side and the left, and behind it on the left side are the internal iliac vessels.

The rectum lies a little to the right side of the middle line and is close contact with the anterior surface of the sacrum. To note the psoas and iliacus muscles in front of the iliac bones, the gluteus muscles posterio to them and behind the sacrum are the erector spinae and the multifidi d. gluteus muscles.

The distance between the iliac crests anteriorly is 14 cm., and the iliac crests measure from before backwards 14 cm.
Description of sections in Case E.

Clinical Notes of Case E.

On January 30th, 1877, Professor Simpson received from Dr. Miller, of Sunderland, a specimen of the anencephalic foetus, and by his kindness I was enabled to make frozen sections of it. Dr. Miller furnished the following interesting clinical history of the case: "In April, 1877," he says, "the mother gave birth to an anencephalic foetus. There was a large sac of liquor amnii, and labour was very tedious. The mother, on this occasion, attributed it to fright whilst carrying the child. She states that she has a great horror of frogs and whilst walking in the country with a friend, the friend picked up a dead frog and threw it at her. On her telling this to the nurse the nurse confirmed her by saying that the child had..."
the appearance of a frog. Six weeks after the birth of this child, she was slightly "unwell," she again became pregnant and expected the child about the beginning of next March (1889). However, on Sunday morning last (January 27th), I was called to see her and found her in labour. The os dilated to the about the size of half a crown. I waited till the os was largely dilated, and then ruptured the membranes, after which there was a tremendous gush of waters. Two or three more pains expelled the child which proved to be anencephalic. Dr. Miller further states that on the husband's side there is a history of hydrocephalus and spina bifida, as by his first wife he had a child which died of hydrocephalus, and another which died of spinal disease. The fact is interesting as bearing upon the theory that anencephalus is due to hydrocephalus in the embryo.
The sections in Case C.

An anencephalic 8 months child was placed in a freezing mixture of ice and salt and allowed to remain there for eighteen hours. It was then removed and sections made in the usual way. Before placing the body in the mixture the spaces of the vertebrae and other landmarks were marked on the skin by means of ink, and this was done to facilitate the making of sections in definite planes. The legs were extended and the arms placed by the sides.

The following drawings were made from the sections obtained.

1. Vertical Sagittal
   1. of left side of head
   2. thorax, abdomen and pelvis

Plate 1
2. The right side of the section represented in Plate I in the region of head and thorax. Plate II
3. The right side of the section represented in Plate I in the region of abdomen and pelvis. Plate III

II. Transverse
1. Transverse section of right side of body at the head of the 15th lumbar vertebra. Plate IV

I did not have made a water-colour sketch of the child before freezing for I already had in my possession drawings of anencephalic children resembling very closely this specimen, and these I append in order to give an idea of the external appearances of this variety of monster. They are named Plates V, VI, VII and VIII Case E.
Case 2. Plate I

This Plate is a representation of a vertical mental section of the anencephallic fetus showing the left side of this section. In the region of the face the section is a little to the right side of the middle line, the bones of the right nasal fossa being seen in section, in the cervical and upper dorsal region the middle line is closely followed but in the lower dorsal, in the lumbar and sacrococcygeal regions the line of section lies to the left of the median plane and we therefore see the left side of the vertebral arches and spinous processes. As in other cases we shall describe first the vertebral column, and then in order the regions of the region of the head, neck, thorax, abdomen, and pelvis along with the organs which lie in these regions.
The Cervical Column.

The vertebrae of the different regions of the spinal column were in this case numbered from below, as the upper cervical vertebrae are abnormal and it is difficult to make out accurately which is the first. In this way we find that the vertebral bodies are present in their normal number but that the spines and laminae of the upper cervical are wanting. Their being so fact a spine bifida in the upper cervical region.

The region of the spine.

The length of the region of the spine was taken and the following are the results of this measurement:

The total length of the spine: 20 cm. (7.8"

The cervical region: 3.4 cm.

The dorsal region: 8.3 cm.

The lumbar region: 4.5 cm.

The sacro-coxal region: 3.5 cm.

The dorsal region is therefore equal in length to any two of the other
regions together, the cervical and sacro-coccygeal regions are practically of equal length, and the lumber region is, more than either the cervical or the sacro-coccygeal regions. In measuring the two sacro-coccygeal vertebral Plate III was referred to, as in Plate I, the terminal coccygeal vertebrae are not visible. It will be noted in comparing these measurements with those made in Case A., that there is a very close correspondence between them, in fact it may be stated that the regions of the spine are normal in regard to their relative lengths.

The Curves of the Spine

There is a distinct curvature in the cervical region and this curve has its convexity anteriorly. In the dorsal region the vertebral column bends backwards, there is therefore in this region a curve with its concavity anteriorly.
The lumbar region the spine has a marked convexity forwards, whilst in the sacro-coccygeal region it runs almost directly downwards and backwards. The dorsal and lumbar curves are probably due to the position in which the body was placed during the freezing process, but the marked convexity forwards in the cervical region notwithstanding the fact that the chin and sternum are in contact is no doubt due at any rate in great part to the abnormal condition of affairs in the region of the head and neck. The peculiar bending backwards of the upper cervical vertebrae bodies is a notable point and is probably intimately connected with the malformation of the cranium and of the vertebral region of the spinal canal (spina bifida).
The Ossification of the Spine

In this Plate the ossification of the spine cannot be very well studied as in the dorsal lumbar and sacro-coccygeal regions the section has passed considerably to the left of the middle line, but the matter will be returned to when Plate II and III fall to be considered. We may, however, note the presence of ossific centres in the bodies and spinous processes of the lower cervical and upper dorsal vertebrae. In the lumbosacral region and also in the lower dorsal on account of the obliquity of the section the primary ossific centre for the left side of the arch in the vertebrae in these regions is brought into view. It will be afterwards seen from a study of Plate II and III that ossification instead of being deficient is, with the marked exception of the upper cervical region, very far advanced in the regions of the spine in this case.
The Spinal Canal

The spinal canal is not seen in all its extent in this Plate, but by referring to Plates II and III which are more nearly in the middle line we get a view of the canal, spinal cord and membranes. The posterior part of the spinal canal in the upper cervical region is wanting and we find as the result a somewhat triangular space containing blood clot and covered by a membrane to which are attached the membranes of the upper part of the spinal cord. This space corresponds in extent to the three upper cervical vertebrae, the posterior part of which are wanting. From the 1st cervical vertebra downwards the vertebrae are present in a normal condition.

The spinal cord was present in the thoracic and lumbar regions but in the cervical only the membranes were seen; but to this point further reference will be made.
The Cranium

In this Plate we see the condition of the Cranium which is typical of the aneu-ophalic child. We observe a total absence of the Cranial vault and of the Occipital and Cerebellum. In this Plate, therefore, we find represented the base of the cranial vault in sagittal section and lying above it is a tumor composed of blood clot and numerous fibres giving to the area a somewhat spongy appearance. This blood clot rests upon the modified base of the cranium and is covered by a distinct membrane. It is impossible from this section alone to trace the bones of the base and their disposition, so far the present we have briefly noted the fact that there has been a union of the various bones, and that at a point which probably corresponds to the prephenoid there is a large plate of cartilage. (For description of bones see Appendix p. 748.)
The face is very at

from this plate, the section has evidently

gassed to the right of the middle line in

the region of the face. The right nasal

fossa has been opened into as its foran

and where it becomes continuous with the upper part of the pharynx.

The turbinated bones of the right side

are divided vertically and below them

is the alveolar and palatal portions

of the right superior maxilla. The

groove of a tooth is seen in the upper

maxillary bone, and it was found to

be the right central incisor.

The palate is seen divided to the

right of the middle line and here

its thick appearance. The uvula

is seen hanging down in the pharyn-

geal cavity.

The lips lie slightly apart from one

another and the tongue is seen in

the mouth with its dorsum in

close contact with the soft palate.
The lower jaw is divided a little to the right side of the symphysis and the gum of an incisor tooth is seen with the posterior surface of the inferior maxilla are attached the muscles passing to the tongue and hypodermic. The large amount of adipose tissue lying superficial to the inferior maxilla is to be noted.

The pharyngeal opening of the left Eustachian tube. It is situated 1.5 cm anterior to the upper end of the vertebral column. A probe passes outward and slightly backwards through the tube into the tympanic cavity. The pharyngeal cavity extends from the base of the cranium as low as the level of the 6th cervical vertebra. The posterior rami become continuous with the pharynx. The opening of the left Eustachian tube is seen and at the level of the 4th cervical vertebra the bony cavity communicates with the pharynx and at the level of the 5th C.V there is the opening of the tympanum.
The Region of the Neck

One of the peculiarities of the annecto-
alic foetus is the apparent absence of
a neck, the head seeming to be
planted directly upon the shoulders.
This appearance is well seen in the
Plate under consideration. In the
region of the neck the section has
very closely followed the middle
line.

The Hyoid bone

It sits the hyoid bone lying above
and slightly in front of the hyoidean
cartilage of the larynx. In position
it corresponds to the level of the
6th cervical vertebra. It is situated
in front of the vertebral column, 1cm
behind the lower margin of the inferior
maxilla and the space between it and
the hyoidean cartilage is only 1mm in
breadth. It is seen its five attachment
to muscular fibres passing to the
inferior maxilla and to the tongue.
The Larynx.

The larynx is seen in this section divided vertically and medially. We note the opening into the larynx, covered by the epiglottis, at the level of the 5th cervical vertebral body. The larynx extends vertically from the middle of the body of the 5th cervical vertebra to the lower border of the 1st cervical.

The thyroid cartilage is seen lying opposite to the intervertebral disc between the 6th and 7th cervical vertebrae, whilst the posterior part of the cricoid cartilage lies opposite the 7th cervical vertebra.

The distance antero-posteriorly between the cricoid and thyroid cartilage is 6 mm. Six millimeters is therefore the antero-posterior diameter of the larynx in this case. The vertical extent of the larynx from the point where it Opens into the pharynx to the commencement of the trachea is 1.2 cm. The lower margin of the cricoid is 8 mm. above the manubrium sterni.
The Thyroid gland

The inner border of the right lobe of the thyroid gland near the isthmus is seen lying in front of the trachea at the level of the 1st dorsal vertebra and of the disc between it and the 4th cervical vertebra. The part seen measures 5 mm. in an antero-posterior direction and 6 mm. vertically. It lies opposite the 15, 2nd, 3rd, 4th and 5th rings of the trachea.

The Oesophagus.

This structure is only seen imperfectly in this section, it will be found to be more thoroughly displayed in Plate II.

The Trachea

The upper end of the trachea lies in this case opposite the 1st dorsal vertebra hence it falls to be described with the thoracic viscera.

The Thymus gland lies in great part in the thorax, and also will be described in that relation.
The Region of the Thorax

In the thoracic region the action is very nearly exactly similar. We have to describe in this region the trachea, the heart and great vessels, the thoracic spine and the walls of the thorax. We shall describe the thoracic boundaries first.

The Wall of the Thorax

The posterior wall is composed of the upper dorsal vertebrae which have already been described. The anterior wall in this plane is made up of the sternum. The sternum from manubrium to costal cartilage measures 11.8 cm, and it has an antero-posterior diameter of some 5 cm in the region of the manubrium to 1 cm in that of the costal cartilage. It is slightly curved with a posterior concavity. The root of the aorta is in the manubrium, and one in the body of the bone. The thymus gland lies behind the sternum above and lower down in the attachment...
of the diaphragm. The diaphragm which forms the floor of the thoracic cavity as seen in this plane is to lie at the level of the 1st dorsal vertebra. In front, however, it passes downward to its attachment to the eumon cartilagus and posteriorly it also passes downwards at its left crus. At the root of the neck the upper aperture of the thorax is seen to contain the thymus gland, trachea, oesophagus, and the left circumcavate vein.

The vertical diameter of the thorax from the level of the upper border of the manubrium to that of the central tendon of the diaphragm is 3-4 cm.

Its antero-posterior diameter at the level of the 2nd dorsal vertebra is 2 cm.; at the level of the 3rd 2.5 cm.; at the level of the 4th 3.5 cm.; at the level of the 5th 4 cm.; and at the level of the 6th dorsal vertebra 4.3 cm. The greatest antero-posterior diameter is therefore
nearly 1 cm. longer than the vertical diameter of the thorax in this plane. The Trachea.
The trachea is seen opened into in all its extent from the lower border of the cricoid cartilage to the point of bifurcation into right and left bronchus. It extends from the upper border of the body of the 1st dorsal to the middle of the body of the 4th dorsal vertebra. It has a vertical extent of 4-4 cm. and an antero-posterior diameter of from 1 to 2 mm. The right pulmonary artery crosses in front of it at its point of bifurcation. The ascending part of the aorta arch also lies in front of it, and at the level of the 2nd dorsal vertebra the left innominate vein crosses in front of it. Above this point the atheros of the thyroid gland is in contact with the trachea. The manubrium sterni lies opposite the 7th ring of the trachea.
The Heart.

The section divides the heart vertically and opens into the cavities of the right and left auricles. The right auricle is more thoroughly displayed in Plate II.

We note the left wall of the inferior vena cava at the level of the diaphragm and at the point where that vessel passes through the diaphragm. The inferior cava is seen opened into the right auricle, and immediately above its opening is the Bucchachian valve and above that the foramen ovale with its membranous curtain. In the anterior part of the right auricle is the communication with the right ventricle closed by the tricuspid valve. In this section, therefore, the cavity of the right ventricle is not opened into, but its thick wall is seen in section. Only a small part of the left auricle is seen, and we note the foramen ovale and the membrane stretching across it.
The heart is surrounded by the pericardial sac, and is related in front to the pharynx gland. Below the heart is the diaphragm, and behind it lie the trachea, the oesophagus, the descending aorta and the right pulmonary artery.

In vertical extent the heart measures in this section, 2.5 cm., whilst anterior-posteriorly it measures 3 cm. It corresponds in vertical extent to the 3rd, 4th, 5th, 6th, and 7th dorsal vertebrae. The foramen ovale lies at the level of the body of the 6th dorsal vertebrae.

The heart seems to be tilted upwards anteriorly. Its apex corresponds to the disc between the 6th and 7th dorsal vertebrae.

The Great Vessels.

The aorta is opened into near to its origin from the left ventricle at the level of the 6th dorsal vertebra, and is again seen as the descending thoracic aorta at the level of the 5th, 6th, 7th, and 8th...
dorsal vertebrae whence it passes through the hiatus aorticus into the cavity of the abdomen. In the first part of its course the aorta passes upward and slightly backwards to the level of the lower border of the 2nd dorsal vertebra, at which point it gives off the innominate artery, and then turns to the left in the transverse part of its arch. Near its origin from the left ventricle the aorta has in front the common pulmonary artery with which it communicates by the ductus arteriosus, and behind it lies the right pulmonary artery which crosses the middle line at this level. The ascending part of the arch lies in front of the trachea. Situated at the level of the disc between the first and 2nd dorsal vertebrae is the left innominate vein which here crosses the middle line to join the right innominate and as form the azygos venae superior. It lies in front of the trachea and behind
the upper part of the thymus gland at the level of the upper border of the manubrium sterni.

The Thymus Gland.

The thymus gland is seen lying anterior to the heart and pericardium and behind the sternum. In vertical extent it reaches from the 1st dorsal vertebra to the lower border of the 6th (2.3 cm).

Its anterior-posterior diameter varies from 1.5 cm superiorly to 5 mm. and less inferiorly where it tapers to a point. It extends upwards as high as the thyroid gland in the neck and posteriorly it is in relation with the left innominate vein, the trachea, and part of the arch of the aorta. It has a pale pink colour and a somewhat triangular shape, the base being at the root of the neck, the apex wedged in between the pericardium and the posterior surface of the sternum.
The Region of the Abdomen

In this region we have to note the liver, stomach, large and small intestines, bladder, bloodvessels etc. The section is to the left of the middle line except at the lower part where it is more medial.

The insertion of the umbilical cord to the anterior abdominal wall is seen to lie on or above the upper border of the symphysis pubis and 11 cm. below the upper end of the umbilicus.

The liver is divided vertically slightly to the left of the middle line of the body, and a little to the right of the spine for the umbilical vein and of the suspensory ligament. It lies anteriorly and inferiorly, the right
hepatic lobe, below it is the quadrate lobe, and posteriorly we find the 
egphelian lying isolated from the rest of the liver substance. Above 
the liver is in contact with the under surface of the diahaphram, anteriorly 
it is related to the anterior abdominal wall at its upper part, lateral 
it lies in the transverse colon and stomach, and behind it the crus of the 
diaphragm and the abdominal aorta.
The greatest vertical diameter of the 
lien is, in this section, 5.2 cm.; the 
smallest, in the region of the Segheian 
lobe, is 2 cm. From Antro-Postei 
only at the level of the 10th dorsal 
vertebra, it measures 3.4 cm. The 
opening of the umbilical vein is seen 
in the liver at the level of the 11th dorsal vertebral body. A vertical 
section through the liver, as seen in this plane, corresponds to the 8th, 9th, 10th, 11th, and 12th 
dorsal and to the 1st and 2nd lumbar vertebral.
The Stomach

The oesophagus is seen in this section passing to the left through the diaphragm at the level of the 8th dorsal vertebra. The lower portion of the stomach is seen under the inferior surface of the liver at the level of the 12th dorsal and of the 1st lumbar vertebra. It was found to be a narrow tubular form reed lying nearly vertically in the abdomen. The pyloric end is seen lying at the level of the 1st lumbar vertebra. This portion of the stomach lies in front of the pancreas and behind the quadrate lobe of the liver and below it is related to the transverse colon of the large intestine.

The Pancreas

This organ lies behind the pylorus and above the 3rd part of the duodenum at this level. Behind it is in relation to the abdominal aorta and above it lies the Spigelian lobe of the liver.
The Pancreas corresponds in vertical extent to the 12th dorsal vertebra and to the upper part of the body of the 1st lumbar vertebra.

The Colon.

The transverse part of the colon is seen lying below the under surface of the quadrate lobe of the liver. It passes to the left, then turns downwards in the abdomen to a point near the pelvis from it then turns sharply upwards again and ascends to the liver while it once more turns abruptly downwards and runs in close contact to the left side of the vertebral column to become continuous with the sigmoid flexure. These details were found out by lifting up the intestines lying on the left side of the abdomen. The disposition of the descending colon is therefore, manifestly abnormal in this case, and this matter will be again referred to later on. The sigmoid flexure is seen at the
level of the 5th lumbar vertebra where it makes a bend and becomes continuous with the first part of the section. The portion of the descending colon which runs downwards in close contact with the vertebral column forms a narrow tube containing little or no meconium. This contradicts strangely with the transverse colon and with the superficial loop of the descending colon and also with that part of the sigmoid flexure which becomes continuous with the first part of the section. For all these last-named portions are largely distended with green meconium mixed with whitish glairy mucus.

The Small Intestine.

We note the 3rd part of the duodenum crossing to the left side at the level of the 2nd lumbar vertebra. The rest of the abdominal cavity at the level of the 3rd, 4th, and 5th lumbar vertebrae is filled with coils of the ileum and jejunum.
The Bladder

Only the left side of the bladder is seen at this section which as has been stated is not meral. The vesical cavity is seen to lie almost entirely above the plane of the brim. It is oval in shape with its long axis running nearly vertically. It measures 1.5 cm. anteriorly, posteriorly and 3 cm. vertically. Behind it is in relation with the sigmoid flexure and uterus, in front it lies in contact with the anterior abdominal wall being attached here to by the urachus the abdominal aorta.

This vessel is cut into from the point at which it passes through the hiatus anticus at the level of the 7th and 8th dorsal vertebrae down to the 3rd part of the duodenum at the level of the 1st lumbar vertebra. The section thus passes to the left of the aorta but we cut at the level of the disc between the 4th and 5th lumbar vertebrae the left common iliac artery and vein.
The Region of the Pelvis

The pelvic region is divided immediately to the left of the middle line. Posteriorly we note the parts of the sacrum, the coccyx as seen in Plate III. Anteriorly is the symphysis pubis and in front of it the fallopian tubes in female.

The vagina is a paired tube and we note the perineum on the walls. Just below the level of the plane of the bron is seen the left lateral vaginal fornix, but the body of the uterus and the cervix are not seen in this section (Vide Plate III.)

The vagina runs downwards and forwards to the vulva. Posteriorly we note the rectum distincted with meconium but the lower part of the bladder rectum is seen only in Plate III, we note here however the side of the anus.

The anterior posterior diameter of the horn of the pelvis measures 2.5 cm.
Case E. Plate II

This Plate represents the right side of the vertical incision section of the head, neck, and thorax in the anencephalic fetus.

The Region of the Head:

In this region the section is to the right of the middle line and so much so that the right orbit has been opened into and the eye-ball partially displaced. Superiorly we note part of the brain cases composed of blood clot which lies upon the base of the cranium. The relations of the fused periosteal bones of the base will be returned to in the second part of this Thesis. Posteriorly we note the spina bifida in the region of the upper cervical vertebrae and the esophageal membranes passing to become attached to the fibrous membrane bridging over the gap in the spinal canal at this point.
The cavity of the mouth and pharynx is cut into by the right of the middle line and we note the right lateral portion of the tongue. The section is on the right of the right nasal fossa and the right superior maxilla with the maxilla is cut into. Dental grins are seen both in the upper and lower jaw.

In the region of the neck, if such a region can be said to exist in this specimen, we note the hyoid bone and below it the anterior part of the hyoid cartilage and below that again the anterior narrow part of the cricoid cartilage. These cartilages are also seen forming the posterior wall of the larynx. In this region the section is in the middle line. The trachea is seen passing down to the level of the 5th dorsal vertebra where it bifurcates into the right and left bronchi.

Behind the trachea we find depicted
the lower part of the pharynx and the oesophageal canal a low down as the upper part of the body of the 4th dorsal vertebra.

In the region of the thorax we have to note that sternum with two osseous centres antero-superior and the clavicular arch inferiorty. Behind the sternum is the thymus gland having as seen in this section a quadrilateral shape with base upwards, and behind it the left innominate vein going to join the yellow of the opposite side. It also note the innominate artery arising from the aortic arch and passing to the right in front of the trachea and behind the thymus gland.

With regard to the heart the cavity of the right auricle is seen with the opening of the inferior vena cava at the level of the 8th dorsal vertebra. The superior vena cava opens into the upper part of the right auricle at the
level of the 5th dorsal vertebra but is not seen in this plate. Posteriorly
and opposite the 6th and 7th dorsal vertebra is the left auricle with the
opening of the left pulmonary vein. At the lower part of the thorax
we note the vena caval aperture in the diaphragm and behind it and
at the level of the 8th and 9th dorsal vertebrae the hiatus aorticus.
We see in this drawing only the upper portion of the abdominal
cavity filled up with the right
lobe of the liver and in the liver
substance is seen the right hepatic
vein.

The abdominal aorta is seen running
downwards immediately in front of the
last dorsal vertebra.

We note the advanced stage of ossification
of the vertebral bodies and the large
desire of the spinal canal which has
in the dorsal region an antero-posterior
diameter of nearly 1 cm.
Case E. Plate III.

This Plate represents the right side of the internal sagittal section of the acetabular fossae in the lower abdominal and in the pelvic regions. Posteriorly we note the 3rd, 4th, and 5th lumbar vertebrae and the sacral and coccygeal vertebrae. The lower sacral and the coccygeal vertebrae are cartilaginous, but an advanced stage of ossification is noted in the lumber and upper sacral bodies. A lumbar curve with convexity forwards is seen, but the curve is almost straight and is directed downwards and slightly backwards. The esophagus turned forwards slightly.

In the lower abdominal region we see the contracted portion of the sigmoid plane making a bend to the right and then becoming continuous with the dilated portion which in its turns passes into the rectum. The rectum
passes downwards and backwards making a bend upon itself opposite the lower end of the sacrum and the coccyx, but the anal aperture is not visible in this drawing.

In front of the rectum at the upper part is the fornix of the vagina, and above this but not opened into is the uterus lying moulded upon the posterior bladder wall. The vaginal canal passes downwards and slightly forwards and at its lower end is part of the left labium minims, the right labium minims, and the right labium majus.

The bladder is seen lying in front of the uterus and above the level of the plane of the brim. The vesical orifice of the urethra lies behind the symphysis pubis. This part of the symphysis is cartilaginous and in front of it lies the adipose fossa pubis.
Case E. Plate IV

This Plate represents a transverse section of the right side of the body of the anencephalic foetus at the level of the 23rd lumbar vertebra and was made especially with a view to examining the condition of the kidney. For in some cases of anencephalus the renal organs have been found deformed or altogether absent. The right however was found in this case to be present as seen in this Plate, but as fortune would have, on the left side of which a transverse section was not made direction afterwards revealed an absence of the left kidney.

This Plate has, I am sorry to say, been lost during the process of mounting and I have not had time to get a duplicate made.
Case E. Plates V, VI, VII, and VIII

Of Case E itself no drawing was made to show the external appearances; but the drawing represented in Plates V and VI so closely resembled Case E that these Plates may be taken as typical representations of the anencephalic foetus.

In Case E, the foetus measured 38 cm from head to heel, and the trunk measured 23 cm in length. The shortness of the child is due to the small size of the head. The shoulders are broad in comparison to the length of the foetus. The head measured, in what may be termed the occipito-frontal diameter, 5.5 cm; and in the occipito-mental, 6.8 cm. The transverse diameter of the head in front of the ears was 6 cm, and that behind the ears was the same. The transverse of the face between the
malar bones was 5.5 cm. and the vertical diameter of the face, the frontal mental, was 6 cm. The transverse diameter of the shoulders was nearly 14 cm. If we compare these measurements with those made on the normal child it will be noted that all the measurements with the exception of the transverse diameter of the body at the shoulders are considerably less than in the healthy child.

In Plates V and VI a female anencephalic fetus very closely resembling that of which frozen sections were made is depicted. Plate V is a front view of the foetus, in Plate VI we view it from behind in order to observe the condition of spina bifida the almost invariable accompaniment of anencephalus.

It will be seen from these plates the deformity in this variety of monsters is one of the head. A neck can
seriously be said to exist, and the small head seems to spring directly from the trunk of the child. The face seems in comparison with the head so narrow and the mouth is slightly opened and the tongue can be seen, the nose also is large, and the eyes are half open, the eyelids being thick and bedevoured looking. The forehead may be said to be altogether wanting for the eyes and root of the nose form the upper limit of the anterior part of the head. The ears have a twisted deformed appearance and rest on the shoulders lying in the same plane as the eyes. The body at the level of the shoulders is seen to be relatively broad, and seems to be especially so in comparison with the small head.

In Plate II, we note the special peculiarity of the anterocephalic bones, the absence, namely, of the cranial vault
and cerebrum and cerebellum, and the presence in their place of a soft reddish vein containing blood clot. Round the margin of this reddish space we note the presence of a few scattered hairs, and posteriorly the cranial deformation seems to become continuous with the vertebral deformity, i.e. the epina bifida. The region thus marked out is somewhat triangular, the apex of the triangle being situated in the middle line of the neck.

The rest of the body presented no notable external abnormality.

In Plates VII and VIII a male acroscephalic fetus is represented which shows even in a more marked way the peculiarities of this monstrosity. The face has a specially monstrous and hideous appearance, the mouth is seen to be widely open, and the tongue protruding. The nose is large, the eyelids thick and
puffy and the ears reel like flaps upon the shoulders. The whole face has a congested appearance, the livid blue of the skin contracting powerfully with the bright red colour of the protruded tongue. In Plate VII the condition of Parts at the back of the head is depicted. The presence of the reddish spongy mass is to be noted extending lower down in the back than in the former case and having also a somewhat triangular form. The toes of the feet are strongly flexed as if the child had died from suffocation, and the external genitals have an abnormal appearance, the testicles not having descended into the scrotum. There is an enormous deposit of adipose tissue below the skin in all parts of the body of this fetus. This is a peculiarity which has often been observed in anencephalic infants.
Drawings of the joints in Case E.

Sections were made of the principal joints in this asececephalic infant.

For irregularities in the feet and hands have often been found in such cases and also in cases of spina bifida alone; but I doubt to pursue here to describe the sections thus made, their description will be incorporated with that portion of Part II which deals with the extremities of the infant.

The further direction of the asececephalic foetus with remarks upon its possible etiology will also be discussed in Part II.
Case 18. Generalized Dropsy of Infant.

Clinical Notes of Case 18.

In March, 1884, Dr. Freeland of Toronto sent to Professor Simpson a still-born infant. Showing in a very marked way the characters of the rare disease known as general oedema of the foetus.

With a view to clearing up certain points in the anatomy and pathology of this condition, I made a series of frozen sections vertical and transverse of the specimen, and thereafter examined most of the vessels under the microscope.

Dr. Freeland kindly supplied me with the following clinical notes of the case.

The mother of the child is 33 years of age and has been nine times confined. The two first children were born alive and are still living and
healthy. Her other confinements (seven in all) have resulted in still-born children, usually between the sixth and seventh month. The eighth child (the one before the present) did not present any morbid external appearances, but the placenta was extensively diseased. The mother has generally been a healthy woman, though very anaemic in appearance. No history of syphilis in either mother or father has been elicited although this matter was very carefully inquired into. Her family history is good, there being no knowledge on her part of her mother or sisters having had still-born children. Her husband is a particularly healthy man.

The confinement in this instance was no easy one. The child was born before Mr. Freeland's arrival, but as the patient states that the quantity
of water was excessive, this more than probable that there was hydramnios. It was said that the child's heart beat for a few minutes after birth, but there was no attempt at respiration. It has been shown that chlorate of potash given internally has a beneficial effect in cases of repeated abortion with placental disease, and therefore the drug was given in this case during the whole course of the pregnancy in the hope that the patient might be able to have a living full-term child.

I have at this time (February, 1887) had sent to me by Dr. Freeland the following additional clinical data on this case. The patient was confined again last year and although Dr. Freeland was not present at the confinement— the patient subsequently told him that the child was exactly the same in appearance as the one
of which I have made sections. "It was," she said, "a fine well-developed child, but full of water." It also was still-born. The brother of the above-mentioned patient resembles her very much in his anemic waxy look and his wife also, a thoroughly healthy woman, has given birth to six still-born children at the birth of one of which Dr. Freeland was present. This child very closely resembled the child of the first patient, being odramatous although not to the same extreme degree. It was through the strong resemblance of the children to one another that Dr. Freeland came to find out that the parents were related. These facts have an etiological significance to which I shall return after the sections have been described.
The sections of Case 4.

A water-colour drawing of the child was first of all made (Plate I), in order to show the external characters of the diseased condition, and then the body was treated in the manner which has been already described under the head of "Preparation of the Frozen Sections." The specimen was allowed to remain in the freezing mixture for three days and then a series of vertical and horizontal sections were made, which are enumerated below.

I. Vertical Sections
1. Frontal sagittal section, Plate II, left side
2. Opposite side of above in Plate III, the region of the head
3. Opposite (right) side of Plate IV, No. 1, in the region of the Pelvis
4. Section 1/4 inch to the left side of No. 1 (right side)  

5. Opposite (left) side of No. 1.  

II Transverse Sections  

1. Section of right half of body at level of the 4th cervical vertebra  

2. Section at level of the 5th dorsal vertebra  

3. Section at level of the 1st lumbar vertebra  

4. Section at level of the cartilage between the first and second pieces of the sacrum
Plate I. Case 4.

This Plate is a water colour sketch which was made of the child before it was placed in the freezing mixture and brings out fairly well the characteristic appearance which it then presented.

The child measured 19 inches in length from the vertex of the head to the foot, and 11 inches from the vertex to the symphysis pubis. The transverse diameter of the chest was 4 inches, and of the abdomen 5½. We note the swollen condition of the abdomen and the general anaærea of the subcutaneous tissue all over the body. The oedematous glossy condition of the skin is well represented and the oedema is seen to be most marked in the thorax, thighs, and in the sacrum. The skin
over the whole surface of the body could be made to pit on pressure, and the presence of a large quantity of fluid in the abdominal cavity could be easily made out. The drawing shows also the oedematous condition of the forehead and of the eyelids. The mouth is seen to be partially open, and the tip of the tongue is seen to protrude to a slight extent. The swollen deformed appearances of the hands and fingers and of the feet is also to be noted.
Plate II. Case II.

This Plate represents a vertical sagittal section of the head and trunk of the hydrocephalus infant named Case II. The left side of the section was drawn in its whole extent, the right side only in the region of the head and of the pelvis (vide Plates III & IV). During the freezing process the child lay upon the back with the thighs slightly rotated outwards, and with the head to a small extent flexed upon the sternum.

This section has, in the region of the head, hit the middle line very exactly; in the region of the neck it has deviated slightly to the right side; in the region of the thorax and abdomen it has very closely followed the middle line, but in the region of the pelvis it has passed
considerably to the left side of the body.

In describing the structures seen in this plate I shall follow the same plan as was adopted in the description of Plate 1, Case A. I shall describe in order the vertebral column, the head, the thorax, the abdomen, and the pelvis; but I shall not enter into anything like the same amount of detail as I did in Case A.

The structures in this and in the following plates are not so clearly defined as in the frozen sections of the other cases, and this is due to two causes, firstly to any want of experience in this method of research and secondly to an indefiniteness of outline of the structures caused by their water-logged condition.
The Vertebral Column

We have to note in this section several points with regard to the spinal column, and first we have to observe the spinal curves. The cervical and upper dorsal parts of the spine run nearly directly upwards, there being only a very slight bending of this portion of the vertebral column to the front. This inclination of the upper part of the spine to the front is such that a line drawn vertically downwards from the body of the axis vertebra falls nearly 3 mm. in front of the 5th dorsal vertebral body. At the same time there is no curvature of this part of the spine only an inclination anteriorly. In the lower dorsal region we note, however, a distinct curve having its convexity to the front. It will be remembered that the child was placed in the freezing motion with
the arms lay by the sides and with the thighs extended and only slightly rotated outwards, and most probably the curvature of the lower part of the dorsal region of the spine is to be attributed to the position in which the child lay during the freezing process. The lumbar portion of the vertebral column has a slight degree of curvature, and in this case we find that the concavity of the curve is anterior. The last lumbar and first sacral vertebra form a distinct prominence and succeeding this is the marked anterior concavity of the sacrum and coccyx (vide Plate IV). The antero-posterior diameters of the bodies of the vertebrae increase as we pass downwards, thus the antero-posterior measurement of the third cervical body is 4 mm, of the first dorsal 5 mm, of the sixth dorsal 6 mm
of the twelfth dorsal 7 mm., and of the second lumbar body also 7 mm. Therefore the antero-posterior diameters diminish slightly, but it is to be remembered that in the lumbar and sacral regions the case was deflected towards the left side. The vertical diameters of the bodies of the vertebral increase from 6 mm. in the cervical to 5 mm. in the dorsal, and to 6 mm. in the lumbar region. There is no marked difference between the anterior vertical measurements of the vertebral bodies and the posterior. All these measurements it will be noted are less than those which were found in the well developed full term child, Case A.

The length of the individual portions of the vertebral column falls next to be required. Careful measurements were made of the several portions of the spine with the following results.
Vertical measurement of
Cervical Region of Spine 3.5 cm
Dorsal do. do. 6.5 cm
Lumbar do. do. 3.3 cm
Sacro-coccygeal do. do. 2.4 cm.
The vertical measurement of the entire spine was, therefore, 16 cm (6 1/4 cm).
The cervical region measures a little more than \(\frac{1}{5}\) of the entire length, the dorsal region between \(\frac{1}{2}\) and \(\frac{2}{3}\), the lumbar region has nearly the same relative size a little more than \(\frac{1}{5}\), whilst the sacro-coccygeal measures about \(\frac{1}{6}\) of the length of the spine.

The cervical and lumbar regions are practically equal in length, the dorsal region is very nearly equal to the combined length of the cervical and lumbar portions, whilst it is more than equal to the cervical and the sacro-coccygeal and to the lumbar and sacro-coccygeal regions.
With regard to the ossification of the vertebral column we note osseous centres in the bodies of all the cervical and dorsal vertebrae, but in the lumbar region we see centres of ossification only in the first and second vertebral bodies; this however was due to the fact of the obliquity of the section in this region. The centres have a round shape in the upper part of the column, but lower down this shape is oval with a longer anterior-posterior diameter. A part centre is seen in the posterior arch of the atlas vertebra, but its anterior portion is cartilaginous. Here is a separate centre in the odontoid process of axis, divided by cartilage from the centre in the body of that bone. Centres are also seen in the spinous processes of the vertebrae. In Plate IV it will be noted they are to be seen centres in the 2nd, 3rd, 4th, and 5th dorsal bodies but the coccyx
is quite cartilaginous. The vertebral canal is laid open in this section from the foramen magnum in the occiput to the commencement of the sacral portion of the canal. At the upper part we note the medulla oblongata lying on the basi-occiput and becoming continuous with the spinal cord at the level of the upper border of the atlas vertebra. The spinal cord is seen lying in the spinal canal in the whole of its extent from foramen magnum to base of sacrum, but the commencement of the cauda equina is not well represented in this specimen. It is a point worthy of note that there was no accumulation of cerebrospinal fluid in the vertebral canal. This fact is of interest in relation to the supposed connection of droopy of the poecilus with the artificially produced monsters of Dareste.
The Region of the Head.

In this part of the section the saw has followed very closely the middle line as is shown by the fact that a portion of the falx cerebri is seen and that the special structures of the cerebrum are visible.

The tissues of the scalp are seen to be laden with watery fluid, although it was not found possible in the drawing to give the exact appearance seen immediately after the parts had thawed.

Anteriorly we note the frontal bone extending upwards from the base of the skull at the anterior fontanelle or bregma. The thickness of the frontal bone, and indeed of the bone forming the cranial vault in its entirety is a little over 1 mm. The anterior fontanelle is found to measure 2 cm. in its antero-posterior diameter, whilst the posterior fontanelle
is a mete slit between the occipital and parietal bones. The section has passed between the two parietal bones along the line of the sagittal suture. The suture is 7 cm. in length. There is, as was to be expected, no trace of either frontal or sphenoidal air sinuses. The base of the skull is seen to consist of the baso-occiput, the post- and pre-sphenoid, and the ethmoid.

The diameters of the head were as follow:

- Occipito-mental diameter 11 cm. (4 1/4 in.)
- Occipito-frontal do. 10 cm. (4 in.)
- Sub-occipito-bregmatic do. 10 cm. (4 in.)

The same method of measuring the diameters was followed as in Case A, and it will be noted that the three diameters are nearly of the same length, the occipito fronto and the sub-occipito bregmatic being exactly equal, and the occipito mental only
slightly longer. The head of this child, therefore, has not got the usual shape which it is found to possess after a normal labour.

With regard to the ossification of the bones of the head we note the cartilage in the occipital bone posterior to the foramen magnum, the cartilaginous plates which intervene, firstly, between the basis-occipital and basis-or post-epiphysial and, secondly, between the post-epiphysial and the pre-physial. A projecting ridge of bone is seen forming the dorsum sellae, and anterior to it is the sella turcica with the pituitary body lying in its concavity. The olfactory process of the cribriform is not developed. The ethmoid bone as revealed in this section was quite cartilaginous, the osseous nuclei in the free ethmoid not usually appearing till the first year after birth.
The Brain and Membranes.

In this section we note that the saw has passed between the right and left cerebral hemispheres and has divided the parts at the base of the brain also on the mid-dle line.

Posteriorly we note a portion of the false cerebri which is seen to be very vascular in this case. The false hides from view the posterior part of the internal surface of the left cerebral hemisphere, but anteriorly we see the convolutions of this part of the cerebrum. We note the marginal convolution and the gyrus fomicatus, but the quadranta lobe is hidden by the false. A portion of cuneate lobe is seen and we also note the tentorium cerebelli seen in section and in the middle line or the straight sinus.

The corpus callosum is seen in section,
terminating posteriorly in the cerebellum and bending downwards anteriorty in the genu. The fornix is seen lying inferior to the corpus behind and as it passes forwards a space is seen to intervene between it and the corpus callosum which is the 5th ventricle; these points are however more clearly seen in Plate III which represents the right side of this portion of the section. Inferiorly at the base of the brain we find the left cerebral peduncle and the Pons Varolii and anteriorly to these last named structures the pituitary body or hypophysis cerebri and the optic commissure. Behind the Pons Varolii is the cerebellum divided very nearly in the middle line and between it and the Pons is the rearall space known as the 4th ventricle. Finally we note the medulla oblongata lying in the basilar groove of the skull.
The Region of the Face.

In this region the section has passed to the left of the middle to an appreciable extent, whilst, as well afterwards he pointed out it has deviated to the right side in the region of the neck. In consequence of the obliquity of the section the relation of the parts is somewhat confusing both in this Plate and also in Plate III in this region. The anterior ethmoidal and maxillary bones and the turbinated bones are divided a little to the left of the left nasal fossa.

The internal carotid artery is cut across for a small part of its extent as it lies external to the pharynx.

The roof of the mouth is seen to be formed by the palatal portion of the superior maxilla by the palatal bone and posteriorly we find the lateral portion of the soft palate.
The left central incisor tooth germ is set in its socket in the superior maxillary bone (see also Plate III). The lips are slightly separated by the tip of the tongue which is partially protruded between the gums. The dorsal surface of the tongue is seen in close apposition with the roof of the mouth there being therefore no real buccal cavity. The tongue measures 3 cm. in length from epipharynx to tip and lying inferior to it are the muscles passing from the lower jaw to the hyoid bone and to the tongue itself (genio-hypoglossal and genio-hyoid). The pharynx is only partially displayed as will be noted under the description of the region of the neck. The subcutaneous tissue of the face, like that in other parts of the body, is markedly oedematous.
The Region of the Neck.

In this part of the section, the case passed considerably to the right side of the middle line and hence we do not get a good view of the pharyngeal and laryngeal cavities. From the fact that the head of the child in this case was not acutely flexed we find that the hyoid bone is separated from the thyroid cartilage of the larynx by a notable interval, the thyrohyoid space. We note also the right side of the ring of the cricoid cartilage is section and we see the commencement of the larynx bounded in front by the epiglottis. Lower down at the level of the 3rd and 4th cervical vertebrae we use the right lateral lobe of the thyroid gland which conceals from view the underlying trachea. The hyoid
bone is situated at the level of
the body of the axis vertebra, and
the thyroid cartilage at the level of
the 3rd cervical vertebral body and
of the disc between it and the axis.
The opening into the larynx from
the pharynx is opposite to the odon-
toid process of the axis vertebra
whilst taking the cricoid cartilage
as the lower limit of the larynx
we find that tracheal end of the
larynx lying opposite to the lower
margin of the body of the third
cervical and disc between it and
the 4th cervical vertebra. The larynx
measures 2 cm. in vertical extent in
this case. The trachea passes down-
wards into the thorax, and in front
of it lies the left innominate vein
and the thyroïd gland which latter
structure has evidently been displac-
ed upwards. Only the upper part of the pharynx is seen.
The Region of the Thorax.

In this region we begin to observe the effects of the distended condition of the abdomen, for we find not only the thoracic contents but also the thoracic wall in front displaced upwards. The section in the region of the thorax is very slightly to the right of the median plane.

Anteriorly we note the sinuses in front of the sternum are very oedematous, the distance from the skin surface to the anterior surface of the bone being a little over 1 cm. The upper margin of the sternum lies at the level of the 6th cervical vertebra, and is, therefore, markedly higher than in normal circumstances even in the infant. The tip of the cartilaginous cartilage is opposite the body of the 6th dorsal vertebra, whilst it will be remembered that in Case
It lay at the level of the 10th dorsal vertebra. The esophagus cartilage also is tilted forwards and indeed the whole sternum is pushed upwards and forwards. We find that the distance between the manubrium sternum and the vertebral column is nearly 1.5 cm, whilst the distance interhernia between the tip of the esophagus cartilage and the body of the 6th dorsal vertebra is 5 cm. The corresponding measurements in case A were 2.5 cm and 5.2 cm. The anterio-posterior measurement of the thorax at the level of the 3rd dorsal vertebra was 3.5 cm.

The thymus gland in this section is found lying behind the manubrium sterni and in the root of the neck at the level of the 6th and 7th cervical vertebrae. It has behind it the left uninnominate vein which passes
to join in the formation of the superior vena cava. The thymus gland, therefore, has also suffered displacement upwards and is much smaller in size than in normal children.

The heart, lying in the pericardial sac, occupied nearly the entire antero-posterior space of the thorax at this point region, and we have especially to note the presence of light yellow coloured fluid in the sac of the pericardium. It will be noted that the fluid in the pericardium lies anteriorly and this although the infant was prone in the dorsal decubitus. The position of the fluid is to be accounted for by the greater specific gravity of the heart, which caused it to settle in the pericardial effusion.

The heart corresponds in vertical extent to the first six dorsal vertebrae, and has its anterior part pushed
somewhat upwards and forwards by
the ascitic fluid in the abdomen.
To note that the section has opened
into the cavities of the right and left
auricles and of the right ventricle.
The commencement of the arch of the
aorta and aloc of the pulmonary artery
are to be seen. The heart has been
divided a little to the right side of
the point at which the buna cava
inferior passes through the diaphragm.
The right ventricle is only opened into
in a small part of its extent, namely
at a point near to the apex of the
heart, the left ventricle is not opened
into at all although the origin of
the aorta from it can be seen, whilst
the right and left auricles are laid
open in nearly their whole extent.
lying posteriorly to the heart at the
level of the 3rd dorsal vertebra to
the right pulmonary artery. The
aorta arises from the left ventricles
at the level of the disc between the 2nd and 3rd dorsal vertebrae, the pulmonary artery arises from the right ventricle in front of the aorta but at very nearly the same level.

The trachea can be traced downwards into the thorax as far as the level of the 2nd dorsal vertebral body, where it divides into right and left bronchi. In front of it lies the aortic arch and the left subclavian artery. The left subclavian artery joins the aortic arch and the left subclavian vein with the thyrocervical trunk, which lies in the posterior mediastinum. At the level of the 4th cervical vertebra the trachea is in contact with the thyroidea gland.

The length of the trachea is seen to be 3.5 cm, and it is opened into only in its thoracic portion where the section is in the middle line. The small rings of cartilage forming its walls are well seen.

Lying posteriorly to the trachea is the oesophagus, which has only been
cut into in that portion of its extent which corresponds to the 6th or 7th cervical and the 1st dorsal vertebrae. It reappears the vertical extent of the thoracic cavity in the middle line as seen in this section is 4 cm. Taking the measurement from the arch of the diaphragm to the root of the neck at the manubrium sterni. The diaphragm, which thus forms the floor of the thoracic cavity, lies at the level of the disc between the 6th and 7th dorsal vertebrae; it is attached in front to the euriform cartilage and behind it passes through its crura to be attached to the vertebral column. The diaphragm is at a considerably higher level in the body in this case than in normal infants.

The lungs are not seen at all in this vertical sagittal section of the thorax.
The Region of the Abdomen.

In the region of the abdomen we note the most remarkable pathological appearances which were seen at this place. The abdomen is seen to be distended and filled in the greater part of its extent by a transparent liquid of a light yellow colour. It is the presence of this serous fluid which has caused the displacement upward of the liver and diaphragm, and of the large and small intestines.

The vertical extent of the abdominal cavity, from diaphragm to pelvic inlet, is seen to be 10.5 cm, whilst in an antero-posterior direction the abdomen measures 6 cm. The umbilical cord is inserted into the abdominal wall 2 cm above the level of the symphysis pubis, and 9 cm below the level of the costal cartilage of the sternum.
The section has passed through the abdomen in the middle line except in the region of the lower lumbar vertebrae where the raw deviated to the left side.

The diaphragm forms the roof of the abdomen and has already been described under the thoracic viscera. Its insertion posteriorly by means of its left crus is not at all distinctly brought out in this Plate, and that was due to the sudden condition of the parts posterior to the liver. It was indeed very difficult to make out with any definiteness the outlines of the various structures. Thus the pancreas has been left undefined and so has the duodenum magnus muscle, although both these structures could be quite well seen but were not definable as to be defined.

The tissues of the lower part of the anterior abdominal wall are very sedentary.
The Liver.

In this section the liver is divided slightly to the right side of the longitudinal fissure and we have to note the right lobe, the quadrate lobe and the lobus Spigelii. Anteriorly the liver measures 5.5 cm. whilst its greatest vertical diameter is also 5.5 cm. It will be remembered that in Case A, the liver measured in an antero-posterior direction 4 cm., and in a vertical direction 5.5 cm. The change in the measurements in this case is due not to any real change in the shape of the liver but simply to the fact that the organ had been pushed by the ascitic fluid upwards and forwards. The anterior portion of the liver being more movable has been more displaced than the posterior part. The liver corresponds in vertical extent
to the six lower dorsal vertebrae and to the 1st lumbar vertebra, whereas in Case A, it will be remembered that the liver lay opposite to the disc between the 8th and 9th dorsal vertebrae, to the 9th, 10th, 11th, and 12th dorsal vertebrae and to the 1st and second lumbar vertebrae. These measurements show the altered position of the liver in the abdomen in this tropical infant. The lobeus Spigelii corresponds in this case to the 4th, 5th, 9th, 10th, and 11th dorsal vertebrae, whereas in Case A it lay opposite the disc between the 9th and 10th dorsal vertebrae, the 10th, 11th and the upper part of the 12th dorsal vertebral body.

The right lobe of the liver is seen to be divided vertically and immediately to the right side of the longitudinal fissure of the liver. The longitudinal fissure, it will be observed, is laid open in part of its extent,
The pancreas lies behind the pylorus but the sudden condition of its tissue and the similar state of the surrounding tissues its exact outline could not be clearly defined. Dying near the posterior abdominal wall and under the margin of the liver are the closely packed together coils of the small and large intestines. Very little meconium is seen in the intestines and the coils are in close contact with one another but at the same time they are not glued together. There being no traces of peritoneal bands or adhesions. The transverse colon is in contact with the pylorus, and is therefore displaced backwards to a very considerable extent. The other coils seen are those of the small intestine and we note the third part of the duodenum crossing the midline line at the level of the 1st lumbar vertebra.
that part namely which is called the umbilical fissure or fissure for the umbilical vein. In this portion of the longitudinal fissure we note the presence of the umbilical vein which has passed upwards in the anterior abdominal wall from the umbilicus to this part of the liver. We lose sight of the vein as it passes still upwards and backwards under the name of the ductus venosus in the fissure of the same name.

The quadrate lobe of the liver is seen lying inferior and posterior to the fissure for the umbilical vein. The lobus Spigelii lies behind the upper part of the longitudinal fissure and is in contact with the diaphragm in this region posteriorly. The lower border of this lobe is seen to be in contact with the pyloric end of the stomach. The liver is not so dark in colour as in Case A.
The Stomach.

In this drawing the only part of the stomach which is distinctly seen is the pyloric end of the viscera at the point where it crosses the middle line to become continuous with the first portion of the duodenum. We note that whereas in the normal infant the pylorus lies at the level of the 1st lumbar vertebra, in this case it lies one vertebra higher up being opposite to the body of the 12th dorsal vertebra. This fact shows that the stomach or at any rate its pyloric portion has in common with the liver, suffered displacement upwards from the presence of the large quantity of ascitic fluid in the peritoneal cavity.

The pylorus lies below the Obus Spigelli, in front of the pancreas, which anteriorly to it lies a quantity of ascitic fluid separating it from the quadrate lobe of the liver.
At the 1st sacral vertebra we observe part of the sigmoid flexure of the colon. The psoas muscle lies along the posterior abdominal wall and extends along the side of the pelvis until, but its outlines and fibres are very indistinct. The aorta is cut into into that part of its course in the abdomen which corresponds to the 7th, 8th, 9th, and 10th dorsal vertebrae, thereafter the section passes to the left of it. The section throughout lies to the left of the vena cava inferior. We note the left renal vein beginning crossing the middle line at the level of the 1st lumbar vertebra to join the inferior vena cava, and lower down, at the level of the 4th and 5th lumbar vertebrae the left common iliac artery and vein.

The rest of the peritoneal cavity is filled with a clear yellowish
liquid, the ascitic fluid. The position of the ascitic fluid was drawn in this Plate before the parts had melted, and hence the appearances seen are perfectly trustworthy. The fluid is seen to fill up the abdomen anteriorly and inferiorly, and in addition to this a layer of fluid extends upwards between the liver and the anterior abdominal wall. The intestines, with the great omentum and the mesentery, have been floated upwards and backwards and are packed in under the liver, as has already been described. The fluid occupies the abdomen for a space, measuring 7 ccm. in vertical extent and 5 ccm. in an antero-posterior direction. The bladder, although abdominal position, is not seen in this Plate, for the section has deviated as much to the left as to pass ones thin viscera (vide Plate IV).
The Region of the Pelvis.

In this part of the section, as has been stated, the saw deviated very considerably to the left of the median plane, so that the pelvic cavity, which has a very short transverse diameter in the infant, is only opened into at its upper part, whilst only the first four pieces of the ilium are seen at all.

Posteriorly we find the 1st piece of the ischium forming the promontory, whilst inferiorly and anteriorly we find that the pubic bone has been divided in the region of the pubic foramen, both the upper and lower rami of the pubes being cut across. The fact that the transverse diameter of the pelvis in infancy is short is due chiefly to the small development of the sacrum and its alae (as seen in these and other sections) and, when the soft parts are incised,
to the large size of psoas muscles. Neither the rectum nor the bladder is seen in this section, but we notice the left ureter crossing over towards the middle line to the bladder. The outlines of the pelvic muscles could not be satisfactorily made out. The antero-posterior diameter of the pelvis at its brim is seen to be 3.5 cm. (1.4 in.) but this is not the conjugata vera which will be noted in Plate IV.

We have to note also the internal iliac artery passing inwards. The external genital organs, consisting of penis and scrotum are to be noted and it is seen that so great is the oedema of the surrounding parts that the scrotum does not hang down in the form of a bag, but is, as it were, embedded in the surrounding adipinous tissues. The penis is seen in section to the left side of the middle line, and the tunica vaginalis.
testis is seen to surround a cavity containing the testicle and a considerable quantity of clear serous-looking fluid.

In the region of the buttock, the adipose tissue is well developed, but it is like the subcutaneous tissue in other parts of the body infiltrated with fluid.
Case 3 Plate III

This Plate represents the right side of the vertical meral section, the left side of which was shown in Plate II, and shows the structures in the region of the head and neck. A detailed description of the various structures will be, therefore, unnecessary.

With regard to the scalp and to the bones forming the cranium nothing further need be added to the description given in connection with Plate II. With regard to the cerebrum it will be noted that the section does not include the tela cerebri posteriorly and hence the convolutions and lobes of the internal surface of the right hemisphere are displayed to view. We observe the occipital lobe and the quadrangular lobe with the parieto-occipital fissure running between them and lying 

off to
or rather a little below the level of the posterior fontanelle. We see also the
margin of convolution lying in contact with
the frontal and parietal bones and ex-
tending as far back as the parieto-
ocipital fissure. A small part of
the falx cerebri is seen at a point
a little behind the anterior fontanelle.
The tentorium cerebelli and the strait
sinus are also seen, as is the cerebellum
itself lying under cover of the lower
part of the occipital bone behind
the foramen magnum.
We note also the corpus callosum seen in
section, the fornix and the cavity
of the 5th ventricle containing serous
bursing fluid. The corpus callosum has
the genu in front and the bourselet
posteriorly.
In the region of the face the section is very
slightly to the left of the median plane,
therefore we see only anterior nares and
the posterior nares and not the whole.
of the nasal fossae. The turbinated bones are divided as is also the palate portion of the superior maxilla in which is found the germ of the left central incisor tooth. The sphenoid and ethmoid bones of the front when they enter into the formation of the base of the cranium are divided a little to the right of the middle line of the head. The tongue fills the buccal cavity and lies with its tip slightly protruded between the lips and with its dorsal surface in close contact with the hard and soft palates. The lower jaw is divided near its symphysis, and the muscles are seen facing from it to hyoid bone and tongue. The subcutaneous subcutaneous tissue of the under surface of the chin is well seen. In the region of the neck we find that the carotid has passed consider
ably to the right side of the middle line for we note that neither the larynx, trachea, nor pharynx have been opened into. We note the opening of the left posterior nares and the buccal cavity at the level of the soft palate but the pharynx itself is not opened into. The section passes also to the right side of the foramen magnum and of the vertebral canal so that we do not observe either the medulla oblongata or the spinal cord. The vertebrae have been divided to the right of the central line of their bodies, the section passing through the right pedicle and lamina.

Behind the vertebrae are the muscles of the neck and the subcutaneous tissue of this region. Anteriorly we note that the section has passed through the upper part of the sternum.
Case IV Plate IV

This Plate represents a vertical section of the lower part of the trunk of the tropical child looking towards the right side. The upper limit of the section is the disc between the 1st and 2nd sacral vertebrae but anteriorly the limit is at a higher level. The saw has, as was noted in connection with Plate II, passed to the left of the middle line so that the canal in the sacrum has not been opened into.

We observe the 2nd, 3rd, 4th, and 5th pieces of the sacrum and the small closed coccygeal bone lying posteriorly. It will be observed that there is very slight curvation of the sacrum, the bone lying almost vertically whilst the iliacs prolonged the line downwards with a very slight inclination forwards. These centres are
seen in the parts of the sacrum, but
the coccyx is cartilaginous.
In front of the sacrum lies the
rectum, which disappears from this
section at the level of the 5th piece
of the sacrum. It passes towards
the middle line, having gained which
it can be traced passing at first
downwards and forwards behind the
prostate and bladder, and then
turning to pass downwards and
backwards towards the anus.
The bladder lies in the abdomen above
the level of the symphysis pubis.
Only a small part of the bladder
has been opened into, the part near to
the fundus and on the left side. The
bladder was found to contain a
clear coloured fogen urine which gave
an indication of the presence of
albumen when tested with alcohol.
The albumen may have been a
post-mortem product, it must be
remembered. From the upper end of the bladder the uraëtus ureteric can be seen passing upwards in the anterior abdominal wall. The bladder has an oval shape, the long axis of the oval passing upward and forward. Behind the bladder is the recto vesical pouch of peritoneum we note the presence of the ascitic fluid, and this fluid is seen also lying superior to the bladder and filling up the lateral part of the pelvis. Anteriorly we note the pubic bone divided a little to the left side of its symphysis. In front of the pubic bone and at a lower level is seen the left testicle lying in the left side of the scrotum, and it has again to be noted that the scrotal skin tissues have entirely surrounded the scrotum. The urethra is not seen.
Plates V and VI represent the opposite sides of a sagittal section of the head and trunk of the infant with general reduction, made at the distance of 1 inch from the section shown in Plate II. In studying these sections it is seen above that a considerable amount of tissue has been removed in the form of dust during the sawing process.

The head and neck have been divided considerably to the left of the middle line of the body, and there are not many points which call for special description in these regions. We note the very markedly bivalved character of the bones of the skull. We observe the parietal and temporal bones which form the cranium at this level and see the external auditory meatus passing
winds to the tympanic cavity. The parietal convolutions of the brain are seen lying in the cranial cavity. In Plate IV the section has in the region of the neck passed so far to the left of the middle line as to cover this part of the head from the trunk. In the region of the chest we note the small size of the lateral part of the chest, body thoracic cavity, the left cardiac ventricle and the two lobes of the left lung which lie posterior to it. We see filling up the space in this region of the thorax. Above the level of the bony framework of the thorax and posterior is seen the scapula, and we also have to note the axillary vessels and nerves passing to the arm.

In Plate VI we note the presence of fluid in the left plural sac and in Plate V the lungs are seen to present the appearances characteristic in case.
where respiration has not been established.

The diaphragm is seen dividing the thoracic from the abdominal cavity and lying in contact with its abdominal surface are the left lobe of the liver and the spleen. It is especially to be noted how the ascitic fluid extends upwards between the anterior surface of the liver and the abdominal wall. The spleen has in Plate V a somewhat quadrangular shape, whilst in Plate VI it is more triangular in form; it lies behind the liver and stomach and above the left supra-renal capsule and the pancreas. The stomach is opened into at its cardiac end and is seen to contain fluid of a greenish colour; it is not seen in Plate VI, the small portion of the wall of having been carried off on the face. The pancreas lies (Plate V) behind the stomach, in front of the left supra-
renal capsule, below the spleen, and rests upon the coils of intestine.
The supra-renal capsule is seen forming a cap for the left kidney; it
sweeps down for some distance on the anterior surface also of that organ
as may be seen in Plate V; but in Plate VI we have the supra-renal
capsule actually separated from the kidney by intervening ascitic fluid.
The adrenal is seen to lie in front of the posterior abdominal wall, below
the spleen which recedes moulded to it behind the pancreas, and upon
the kidney. It is also in contact anteriorly with the coils of intestine.
The left kidney is seen in longitudinal section and the pelvis has been opened
out, but the section spaces so much to the left side of the middle line
that we do not get a view of the hilum (cf. Case A Plates II & III). The
harness of the kidney to the fascia of...
surface of the back is to be noted, the tissues intervening measure only 1 cm in Plate II and 6 mm in Plate IV.

The coils of large and small intestine are seen in Plate X but are absent in Plate VI. This section, therefore, marks the lateral limit of the intestines in this case. The rest of the abdominal space laterally is filled up with ascitic fluid. We, therefore, conclude that the intestines have been not only pushed upwards and backwards but also towards the middle line; in conformity of this we may compare Plate IV which represents a transverse section on the right side. The intestines are seen to be packed in between the liver in front and the diaphragm and suprarenal capsule behind whilst above them lie the stomach, pancreas, and spleen. In the lower part of the abdomen we note the sigmoid flexure cut transversely.
The ascitic fluid therefore, fills a very large portion of the peritoneal cavity, pushing its way upwards in front of the liver, displacing the diaphragm upwards, bulging the anterior abdominal wall forwards, and floating the large intestines upwards, backwards and towards the middle line of the body.

We note also in these two plates the extraordinary condition of the subcutaneous tissue in the abdominal region. It measures at some parts nearly 2 cm in thickness and is infiltrated with fluid to a most remarkable degree.

We note in the lower part of the drawing that the section has passed through the acetabular cavity of the os innominatum dividing the head of the left femur as it lies in the cavity of the joint, the left thigh also to recur in section.
Case II. Plate VII

This plate represents a transverse section of the right side of the body at the level of the disc between the 6th and 7th cervical vertebrae.

The first rib is seen in a great part of its extent. The scapula with the muscles anteriors and posteriors to it is seen in the posterolateral portion of the drawing.

The upper part of the thorax is opened wide and we note the apex of the right lung.

Anteriorly are the serratus muscles in front of the upper part of the chest and of the shoulder.

The trachea is not seen as this section is to the right side of the middle line of the body.
Cass A. Plate VIII

The section, of which this plate gives a representation, was made at the level of the body of the 5th dorsal vertebra. Posteriorly we find the right half of the body of the 5th dorsal vertebra, and articulated as it is the 5th rib on the right side of the body. In the thoracic cavity is the base of the right lung and anteriorly to it is the upper surface of the diaphragm. The section has cut away a small portion of the diaphragm and through the aperture thus made we can see the upper surface of the liver and the ascitic fluid lying upon it. In the thoracic cavity itself we note the presence of fluid surrounding the lung and also in the anterior part of the thorax. We note, also, the edematous condition of the muscular and subcutaneous tissues in this, as in the other sections.
Case 4. Plate IX.

This Plate represents a transverse section made at the level of the body of the 1st lumbar vertebra. This Plate should be compared with Plate XI at Case 3 which is made at the same level.

We note the right lobe of the liver separated from the abdominal wall by ascitic fluid, and we observe the gall bladder lying in the fissure of the same name. We note also the second part of the duodenum and the vena cava inferior.

Posteriorly we observe that the right supra-renal capsule has been divided and lying at a lower level is seen to be the upper end of the right kidney. We note the 1st lumbar vertebra, the muscles of the back, and of the abdominal wall, and the general emaciated condition of the tissues.
Case 4, Plate X

In this Plate is represented a transverse section made at the level of the upper part of the second piece of the sacrum, posteriorly, but anteriorly the section is on a plane somewhat above this. Be note the body of the vertebra and the socal canal posteriorly with the iliac line stretching out laterally, and in front of this part of the sacrum is seen the rectum as it lies in the middle line.

The peritoneum is seen passing downwards and inwards into the cavity of the pelvis.

The rest of the abdominal space here is quite filled up by ascitic fluid, and it only remains for us to note the serous and subcutaneous tissues, and of the various muscles making up the abdominal walls.
Case 4

Description of the Placenta and Membranes.

The Placenta had a diameter varying from 19 cm. to 17 cm., and a superficial area of 323 cm. It was relatively rather thick, the measurements being from 4 to 3 cm. The insertion of the umbilical cord was eccentric, being only 6 cm. from one border of the placental mass.

The uterine surface of the placenta had a very characteristic anaemic and gelatinous appearance, and its substance was very friable, so much so that at the time when the specimen came into my hands the placental lobes were torn in several places. Near the margin of the placental mass at one spot was a partially decoloured blood clot 2.5 cm. in thickness and with a diameter of about 5 cm. The anaemic appearance
of the fetal surface of the placenta was most marked, the bloodvessels did not stand out as dark bands in the usual way, but except at the point of insertion of the cord they were difficult to trace from their collapsed condition.

The amnion was normal in appearance, perhaps a little less transparent than usual; the chorion on the other hand was distinctly thickened and on its maternal surface the decidual membranes were very well everted as reddish patches.

The portion of umbilical cord which was attached to the placenta measured 43 cm. in length and this together with 9 cm. which were attached to the child gave a total length of 52 cm. (20½ inches). The circumferences of the cord...
was cut and the vessels of the cord were nearly quite empty, the vein alone containing a small amount of blood clot.

In a section of the cord we note that with the naked eye we can see the umbilical vein and the two umbilical arteries with an intervening true arterial network and a translucent gelatineous mucous the so-called Wharton's jelly surrounding the cord is the thin amniotic membrane.

The above sketch shows one of the umbilical arteries in cross section, surrounded by the jelly of Wharton. We note the endothelial lining, the thick intima, and the muscular media.
Case G. Plate I

A few words are all that are necessary with regard to this case. The woman from whom this gravid uterus and contained child was removed died in the 4th month of her pregnancy from pneumonia. The specimen came into Professor Simpkin's possession and he kindly allowed me to utilize it.

I drew off, with an aspiratory syringe, the liquor amnii and then having tightly ligatured the cervix and uterine ends of the Fallopian tubes I injected in its place Bülhner's fluid. This was done with the view of hardening the parts involved in order to examine the relation of cervix and so-called lower uterine segment, but this investigation does not enter within the scope of this thesis. After a time the uterus was opened by a crucial
incision in its anterior wall. The placenta was found attached to this wall of the uterus and behind it was the child folded up and situated in the position shown in the Plate.

The head had probably lain on the right occipito-posterior position at the time of the mother's death. The cord, it will be seen, passes from the anterior and upper part of the placenta backwards round the back of the child, it reappears over the left shoulder, and then passes between the thighs as it is inserted at the navel of the child. It is to be noted that whilst the thighs are flexed upon the abdomen, the legs are extended upon the thighs and not flexed as is usually stated. Neither are the feet bent up towards the legs. The toes touch the forehead of the child. The black line
indicating the vertical axis of the uterus, the artist having unfortunately tilted the specimen round whilst sketching it.

The form of the child's head has an important bearing in this case for labour had not commenced at the time of death and therefore we may regard the head as a normal unmolded one but as this subject full reference is made in Part II, Chapter I where the head diameters are given.

The length of the foetal ovoid was 18.2 cm., and the distance from the trochanter major to the external malleolus was 11.5 cm.

The posterior fontanelle lay almost directly over the external orifice of the cervix, but it is evident no certain conclusions with regard to the exact relations of the child can be drawn from this preparation as the parts may have been slightly displaced.
Case H. Plate I.

During the dissection of a normal full-time infant I noticed a peculiarity with regard to the external genital organs to which Pozzi has recently drawn special attention. This peculiarity consisted in the presence of a ridge of tissue in the middle line of the vestibule passing from the clitoris to the meatus urinarius and known as the male vestibular band.

I had a drawing of the external genitals made and the drawing I shall now briefly describe under the title of Case H. Plate I.

The labia majora and minora have been drawn slightly apart in order to reveal the subjacent structures. Superiorly we note the Graft Veneris, and below it in the middle is the clitoris with its prepuce and speculum. The prepuce is seen to be formed by the
upper anterior of the two anterior divisions of the labia minora on each side, the clitoris lies the posterior or lower of these two subdivisions. Nine millimeters below the clitoris and also in the middle line is the opening of the urethra urinaria, and behind the clitoris and urethra is a somewhat triangular space, the vestibule, which is bounded laterally by the labia minora. In the middle line of this vestibule is an irregular ridge of tissue running from the clitoris superiorly to the urethra urinaria inferiorly. This ridge, which Prazzi states is fairly constantly found in the new born female child, has been called the "male vestibular band in the female." According to this observer this band makes a figure of 8 turn around the urethra urinaria to become continuous with the hymenal membrane. To these points full reference will be made in Part II of this Thesis.
The vaginal orifice in this case is a vertical slit having a hymenial membrane surrounding it on all sides, it is 6 mm. in length.

Behind the vaginal orifice is a space lying between the posterior ends of the labia minora, and known as the fourchette, and between the fourchette and hymen is a dimple called the fossa navicularis. Behind the fourchette is seen the skin covering the perineal body, and behind that again was the anus, but the specimen was removed from its connections at this point, therefore the anus is not represented anatomically are the labia majora and minora, the former blending anteriorly with the mons veneris and posteriorly with the perineum, the latter forming anteriorly the prepuce and frenum of the clitoris and posteriorly merging in the fourchette. The annora measured 1.5 cm. in length.
Case I. Plates I and II.

These two Plates give representations of the appearances presented by a foetus for which I am indebted to Sir William Turner, who kindly allowed me to make a dissection of the specimen. The foetus was sent to him without any explanatory note or name of sender, from the Isle of Man; and although I wrote to the Edinburgh graduates in that island, I was unable to obtain any clue to the sender and consequently was unacquainted with the clinical history of the case.

We shall here simply describe the external appearances of the child as shown in these Plates and shall reserve a consideration of the condition of the skeleton for the second part of this thesis. Provisionally we may style the case one of intra-uterine ecchymosis, the features which attract immediate...
Notice are the contorted condition of the limbs, the presence of nodular swellings in the position of the joints of the limbs, shoulder, elbow, wrist, knee, hip, and ankle, and the presence of a distinct projection in the position of the coccyx. These features are evident to the eye, but on handling the parts, we note two other additional characters, namely the immobility of the limbs at the various joints and the great fragility of the long bones of the limbs for the manipulation of the femur and humerus both broke across. The length of the fragment also is another feature to be noted. The position in which the child lies probably closely approximates the attitude whilst in utero, the legs locked into one another, the chest flexed upon the sternum, and the arms folded upon the chest. The measurements were as follow:
The om. diameter measured 11.5 cm.
  " 0.7 "    " 10.2 "
  " s.f. "    " 8.9 "
  " B. P. "    " 8.9 "
  " B.T. "    " 7.4 \\

The anterior fontanelle measured 3.1 cm in an antero-posterior
direction, and 3.8 cm. transversely.

The thorax had an antero-posterior diameter at its upper part of 5.1 cm., at
its lower part of 4.6 cm., and at the
middle of 6.4 cm.; the transverse
measurement of the chest was 5.1 cm.

The lower end of the sternum was tilted
sharply forwards and through the skin
the scapulae could be felt having
a contorted form.

On opening the abdomen a quantity of
serous fluid was found, but there
was no glazing of the intestines or
signs of inflammation. The testicles
which had not descended into the
scrotum were found lying in front
of the pector muscles a little above the plane of the pelvic brim. The kidneys were distinctly lobulated. In the thorax the lungs were found unexpanded and so the heart the fractures of the ribs and thoracic arteries were patent. There was abundant subcutaneous adipose tissue and some edema of the feet and ankles. The absence of the testicles from the scrotum and the presence of the tail like appendage gives the external genitals a peculiar and striking appearance (Plate II). The total length of the child was 49 cm, and the length of the head and body to the tip of the coccyx was 35.6 cm. The circumference of the body at the level of the umbilicus was 23 cm, and at the level of the anus 21.4 cm. The legs and arms were measured in order to bring out the swollen condition
of the ends of the long bones. Thus the circumference of the leg below the knee 5.1 cm, at 11 cm above the knee 6 cm, at 8.7 cm below 6 cm. We thus see that in the case of the lower limbs the circumference at the knee was more than twice that below the knee, whilst in the upper limb the circumference at the elbow was half as large again as the circumference below or above that joint.
Case K. Plate I.

This Plate gives a representation of an infant showing the rare form of monstrosity called Phocomely. The mother of this child was delivered as an outpatient of the Royal Maternity Hospital by Dr. Thomas A. Kellice in the beginning of November 1888. Professor Simpson showed the specimen at the following meeting of the Edinburgh Obstetrical Society, and afterwards removed the skin and stuffed it, and it is now preserved in the Obstetrical Museum of the University. The description of the skeleton shall reserve for the second part of this thesis, describing in the meantime the external appearances which are represented in this Plate. The monster is an example of the phocomelic variety of ectromelous infants, the name phocomely having been
given to it from the close resemblance which the limbs bear the hips of a seal (Pisoca, a seal and lid of a limb). The short stumpy extremities and the hydrocephalic head give to the infant an appearance closely resembling that seen in some cases of intra-uterine rickets, and the disease is apt to be mistaken at first sight for this disease; but as will be afterwards shown the condition of the skeleton is quite different in the two cases.

The length of the child from the summit of the head to the heel is 25.8cm whilst from the head to the coccepe it is 26.6cm. It is of the female sex. A large membranous space is found separating the two halves of the frontal bone in the region of the frontal sinuses. The face, with the eyes, nose, mouth and ears, is normal in appearance. The
abdomen is distended. The upper limbs are excessively short and fit like measuring only some 4 inches in length. All the fingers are present. The legs are also short and etrunked and there are only four toes on each foot (eroded). The infant was still born.
I shall have occasion in the second part of this thesis to allude to a considerable number of specimens which have not been described in this part as no drawings were made of them and because their description here would simply occupy space unnecessarily and cause needless repetition. I may state, however, that through Professor Simpson's kindness I have been able to avail myself of the collection of infants and foetuses in the pathological museum in this University, and have also made post-mortem examinations of many dead children which have come into the possession during the past four years. This material in addition to that already described has formed the groundwork upon which I have based the conclusions
Found in the second part of this thesis.

End of Part I.