

THE FORM AND POSITION OF THE THORACIC AND
ABDOMINAL VISCERA OF THE RUFFED LEMUR
(*LEMUR VARIUS*).

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INTRODUCTION.

THE present communication constitutes Part II. of a paper which I read before the Section of Anatomy and Physiology on a former occasion.^a In this part the abdominal and pelvic organs of *Lemur varius* are described. Since the paper dealing with the thoracic viscera was published I have had the opportunity of dissecting a male specimen of *Lemur flavifrons*, a species which closely resembles *Lemur varius*. Several catarrhine apes, and other animals, have also been examined for the purpose of comparison. All specimens were thoroughly hardened with injections of formalin, and, as in the case of *Lemur varius*, particular attention was paid to profile dissections and to such as displayed the vertebral column and its relations to the level of the abdominal organs. In most cases the dimensions were worked out, but the results can hardly be said to express the proper average sizes of the viscera, seeing that only three Lemurs (including two species) were dissected.

^a *Vide* Transactions of the Royal Academy of Medicine in Ireland. 1899. P. 562.

PART II.

ABDOMINAL VISCERA.

General Position.^a—When the abdominal cavity is opened from the ventral aspect, and the organs examined *in situ*, it is manifest that they occupy a somewhat different position from those in Man and some of the Anthropoid apes. Thus, in the Lemur the greater part of the liver, which comes into contact with the posterior aspect of the anterior abdominal wall, consists of the left lobe. This is mainly situated in the middle line, below the xiphy-sternum, and between the tenth pair of costal cartilages. But the lower part of this lobe of the liver descends from under shelter of the costal arches, covering some of the anterior surface of the stomach (fundus, lesser curvature, and part of pylorus). A small, wedge-shaped part of the cystic lobe, where it appears below the tenth right costal cartilage, is also related to the posterior aspect of the anterior abdominal wall. The right lobe, being placed relatively far back, lies under shelter of the lower costal arches, the diaphragm and pleura intervening. This part of the liver is best seen in a dissection made from the right side (*vide* Plate IV. (B.) L.). In the Anthropoids which I dissected—viz., *Troglodytes niger*, *Satyrus orang*, and *Hylobates hainanus*—both the right and left lobes of the liver come into contact with the posterior aspect of the anterior abdominal wall in the epigastric region. In these animals the cystic has blended with the right and left lobes.

In *Lemur varius* almost the whole anterior surface of the moderately distended stomach (below the liver) is directly related to the ventral wall of the abdomen; in man only a very limited portion, as it presents in the epigastric region. *The stomach of the Lemur reaches to a lower level in the abdominal cavity than that of Man.* In the former

^aThe animal is supposed to be in the erect posture as the abdominal organs are described in the text.

most of the anterior surface of the stomach lies below the sub-costal plane, extending to a point midway between the ensiform cartilage and the symphysis. In Man, on the other hand, by far the greater part of the anterior surface of the stomach lies under shelter of the lower costal cartilages and ribs of the left side; and, when even moderately distended, this viscus seldom crosses below the sub-costal plane. When the great omentum is removed several coils of intestine are seen lying below the stomach. These belong to the jejunum and ileum, the transverse colon being hidden from view by the stomach, which lies anterior to it. The bladder projects above the symphysis pubis, resembling in form and position the same organ of the human foetus (*vide* Plate V. (A.), (B.)).

Position of the Viscera as seen from the Dorsal aspect.—Before disturbing the posterior abdominal organs, the position which they occupy in the abdominal cavity may be noted at this stage of the dissection. Further on the relations of each will be described.

The kidneys do not occupy the same level. The right is the higher of the two,^a and its upper third is covered by the right pleura and diaphragm. The summit of the left kidney reaches to the lower end of the diaphragm, at the level of the upper border of the second lumbar vertebra. It is interesting to note that the difference in level of the two kidneys is the reverse of the condition found in Man; in the latter the right kidney usually occupies a slightly lower level. In the Hainan Gibbon (*Hylobates hainanus*) I found that the two kidneys occupied the same level. In the Lemur the spleen is related to the outer side of the left kidney. The former viscus extends upwards, beyond the kidney, under shelter of the pleura and diaphragm. Only a partial view of the spleen can be obtained from the

^a In *Lemur flavifrons* the difference in level seemed more marked. The right kidney is higher than the left by more than its whole length.

dorsal aspect before the pleura and diaphragm are removed. Below the kidneys two coils of intestine, an outer and an inner, are situated. On the left side they run almost vertical and parallel with each other. The outer is part of the ileum; the inner the descending colon. The left ureter descends on the dorsal aspect of the latter. The two coils of intestine below the right kidney take a more tortuous course. The upper and inner one is the duodenum; the lower and outer the attenuated or 'vermiform' portion of the elongated cæcum. The right ureter descends on the dorsal aspect of both these portions of intestine (*vide* Plate V. (B.), (U.).

THE PERITONEUM.

The manner in which this serous sac is related to the abdominal parietes, and is reflected over the viscera, differs only in minor details from the peritoneum of the human subject.

(A.) *Parietal Peritoneum*.—It descends low down into the pelvis, clothing the rectum as far as the prostate, to which latter it gives a partial covering. It then ascends on the posterior wall of the bladder, the seminal vesicles receiving an investment. In the female the parietal peritoneum is reflected from the rectum to the posterior vaginal wall, clothing its upper half. From this the peritoneum is carried over the uterus, the anterior and posterior surfaces of which it almost entirely covers. The line of reflection from the uterus reaches to the upper aspect of the neck of the bladder behind. Laterally the peritoneum leaves the bladder, and is reflected on to the pelvic wall at a slightly higher level; the bladder therefore is largely invested by peritoneum.

(B.) *Visceral Peritoneum*.:—

1. The duodenum possesses a mesentery along its whole length, between the folds of which the pancreas sends a few of its processes.

2. The large intestine, from the cæcum to the lower part

of the rectum, is connected with the posterior wall of the abdomen by a mesentery.

3. The epiplöon (great omentum) is an extensive fold reaching to the symphysis. In the Lemurs which I dissected its four layers could be separated. They were exceedingly thin and transparent, with numerous masses of fat lobules between them.

4. The gastro-hepatic omentum is long; narrow below, but widens out as it approaches the transverse fissure of the liver. Its length measures 6 cm.

THE STOMACH.

The fundus of the stomach, when moderately distended, is rather ovoid in shape, its long axis being almost vertical.^a The pylorus is of considerable length, and is bent sharply on the fundus, proceeding in an upward direction towards the liver. The major axis of the pylorus is also nearly vertical. In this way the lesser curvature is reduced in width; indeed below the liver it is extremely narrow. This curvature is somewhat sickle-shaped. The pyloric and cardiac openings somewhat approach each other, the latter being some distance below the summit of the fundus. The anterior wall of the stomach is thickened by a band of fibrous tissue which extends from the cardiac to the pyloric opening (F.T., Plate I.). As already mentioned, the stomach of *Lemur varius* is comparatively large, most of it belonging to the fundus. The greater curvature extends downwards in front of the transverse colon and the terminal stage of the duodenum; *in Man it is situated above these parts of the alimentary tract.*

The greater curvature may be divided into three stages, according to the different directions which it pursues. The

^a Compared with the stomach of *Chiromys* it appears to be more elongated. *Vide* monograph on the *Aye-aye* (Owen. Trans. Zool. Soc. 1866).

first is short, and extends upwards, with a slight inclination to the right, from the cardiac orifice to the fundus. It measures 2·5 cm. The second descends almost vertically and is 10 cm. long. The third is directed horizontally to the right for a short part of its course; it then ascends, almost parallel to the second stage, as far as the pyloric opening. This part of the greater curvature measures 7 cm. The omenta attached to the curvatures of the stomach have been described (see Peritoneum).

Relations.—The viscera forming the “bed” on which the stomach rests are more in number than those found in the human subject and some of the higher apes. Thus, in addition to the inner surface of the spleen, the front of the left kidney, with its adrenal capsule, the pancreas and the meso-colon, the stomach of *Lemur varius* is related posteriorly to the duodenum, hepatic flexure, transverse colon, and a small part of the right kidney.

Anterior Relations.—These have been mentioned already in a great measure when describing the position of the stomach *in situ*. It has been shown that the lesser curvature and upper part of the fundus^a lie under shelter of the left and cystic lobes of the liver. The remaining part of the front wall of the stomach comes into direct contact with the posterior aspect of the anterior abdominal wall. This is an extensive gastric area, measuring 5·5 cm. vertically, and 6·5 cm. transversely. Lastly, a very small part of the extreme left of the summit of the fundus is related to the cupola of the diaphragm, immediately above the upper end of the spleen, where the latter is crossed by the twelfth rib. As the pylorus ascends towards the under surface of the liver it is lodged in a definite and elongated *hepatic recess*, bounded in front by the lower parts of the cystic and left lobes,

^aThis part of the stomach, when distended, leaves a deep concave impression on the under surface of the left lobe of the liver.

and behind by the right lobe. At the summit of this recess is the gall-bladder; here the pylorus terminates by bending backwards and downwards to form the commencement of the duodenum, which, in the upper part of its first or vertical stage, passes downwards in the same hepatic recess running parallel to the pylorus (*vide* Plate IV., B.).

Topography of the Gastric Orifices :—

Cardiac—Opposite the lower border of the 12th dorsal vertebra.

Pyloric—Opposite the lower border of 1st lumbar vertebra.

N.B.—These openings are close to each other, there being only 3·5 cm. between them.

Dimensions.

Length of fundus	-	-	-	11·5 cm.
Breadth of „	-	-	-	9·5 cm.
Length of pylorus	-	-	-	4·5 cm.

THE SMALL INTESTINE.

In the *Lemurines* this part of the digestive canal varies in length. In many species it is about three times as long as the body. In *Galeopithecus* it may measure four times the body length. In a male of this genus, according to Owen,^a the small intestine was four feet four inches, the body, from the apex of the nose to the root of the tail, measuring one foot four inches. In *Lemur varius*, I found that the small intestine measured twenty-four inches,^b the total length of the animal, omitting the tail and limbs, being sixteen inches. Most of the coils occupy the cavity of the abdomen proper, the pelvic basin being too small to accommodate more than a few inches of the ileum. Throughout the greater part of its extent the small intestine possesses a wide calibre, especially at its com-

^a *Anatomy of Vertebrates*. Vol. 3, p. 430.

^b The small intestine of *L. flavifrons* measured 27 inches, the body being the same length as that of *L. varius*.

mencement (duodenum). Towards its termination (ileum) it narrows considerably. Some of the solid viscera are small in proportion to the size of the intestinal coils. The pancreas affords a good example of this, the head of which occupies only a small part of the large duodenal loop.

The Jejunum and Ileum.—These coils, together with the duodenum, are attached by a well-defined mesentery, the root of which extends from the upper border of the first lumbar vertebra downwards to the right iliac fossa, measuring 2.5 cm. In the Lemurs which I dissected I observed that there was a quantity of fatty tissue contained between the two transparent layers of the mesentery. In the upper part of the jejunum villi are numerous and well marked. In the rest of this sub-division of the intestine the villi are smaller and less numerous. Valvulæ conniventes are confined to the duodenum. Peyer's patches seemed to be absent from the jejunum and greater part of the ileum, although I detected a few feebly marked ones near the ileo-cæcal valve. Numerous small villi beset the mucous membrane of the ileum.

Calibre of the ileum = 9 to 14 mm.

Do. do. jejunum = 5 to 7 mm.

Total length of small intestine = 24 inches, of which $6\frac{1}{4}$ inches belong to the duodenum.

The Duodenum.—This part of the alimentary canal is rather L shaped with the angle rounded off. It may be conveniently divided into two stages. The first includes the longer and vertical limb; the second, much shorter, crosses the spine almost in a transverse direction *at the level of the fourth lumbar vertebra*, terminating in this respect at a comparatively lower level than the duodenum of Man.

Relations.—The vertical limb, which is four inches in length, is lodged, for the most part, in the hepatic recess alongside of the pylorus. At its commencement the

duodenum abuts against the gall-bladder. Emerging from the hepatic recess, it is directed downwards and slightly backwards, coming into close contact with the lower part of the right lobe of the liver and the front of the right kidney. The latter organ exhibits a distinct impression of the duodenum. The right ureter, where it emerges from the hilum of the kidney, is related to the duodenum posteriorly. Below the liver a portion of the stomach lies in front of both stages of this part of the intestine. The head of the pancreas is related to the inner side of the vertical stage of the duodenum, whereas the second stage is not directly related to the pancreas. Thus the pancreas and duodenum in the Lemur differ in their relations to each other from the same organs in the human subject. The hilum of the right kidney projects to the inner or left side of the vertical stage: the portal vein, hepatic artery, and common bile duct being posterior relations. The transverse limb is only $2\frac{1}{4}$ inches. It begins immediately below the right kidney, and seems, by the course it pursues, *to correspond to the third stage of the duodenum in Man*. From right to left it ascends very slightly. The inferior vena cava and the aorta lie behind it; the stomach and transverse colon are situated in front^a (*vide* Plates III., IV. (B.), and V. (B.)). The calibre of the duodenum is wide; when moderately distended it measures from 10 to 20 mm. In Man the calibre is from 35 to 50 mm., being narrower in proportion.

The mucous membrane is everywhere beset with numerous large and well-marked villi, but in the Lemurs which I dissected the valvulæ conniventes were few in number and feebly developed.

The characteristics of the Lemurine duodenum may be summarised as follows:—

^a For relations of duodenal-jejunal flexure see p. 460.

1. Its peculiar L shape.
2. The incomplete mode in which it embraces the head of the pancreas, due to the discrepancy in size between the head of the latter viscus and the curve of the former.
3. Its complete investment by peritoneum along its whole length.
4. Its large calibre.

THE LARGE INTESTINE.

This part of the alimentary canal is relatively long. If the tapering 'vermiform appendix' be included in the measurement of the cæcum the total length of the large intestine amounts to $23\frac{1}{2}$ inches, or half an inch less than the small intestine. The transverse colon, which is curved, is a short segment of the tube; it is 2 inches in length.

The hepatic and splenic flexures are not very pronounced. The former reaches to a higher level than the latter, *contrary to the condition found in Man*. The descending colon passes over the brim of the pelvis into the rectum, almost in a straight line; the sigmoid loop is therefore not represented. The whole length of the large intestine is completely invested by peritoneum, so that the different parts of the colon and the cæcum, being swung by a mesentery, enjoy a considerable amount of movement.

Mucous Membrane.—This presents no peculiarities, except that here and there (especially in the cæcum) it is folded, resembling *valvulæ conniventes*. On examining these folds I found that they were not permanent; by stretching the gut they could be obliterated. They were probably produced by contraction of the external longitudinal muscular bands. In two young dog-faced baboons I found the mucous membrane of the lower part of the colon in the same condition. These apes were thoroughly hardened with 10 per cent.

solutions of formalin repeatedly injected through the femoral arteries. In *Lemur varius* a few solitary follicles could be detected in the ascending colon.

THE DIFFERENT PARTS OF THE LARGE INTESTINE.

The Cæcum.—This viscus varies so much, even in allied species, that a study of its form and position seems to offer but little help towards the classification of animals according to their structural affinities. In the order of *Prosimiæ* (Lemurs), which in itself is limited, we find that the extent of variation, especially with regard to the length of the tapering apical or 'appendix-like' portion, is very marked. This is noteworthy, considering that practically all the members of the *Lemurine* group partake of a somewhat similar diet—viz., a mixture of insects, eggs, small animals, and vegetables—for which reason it might be expected that the length of the cæcum, including its 'vermiform' portion, should not vary to any great extent. However, an examination of even a few genera proves the contrary to be the case.

Galeopithecus lives on insects, larvæ, eggs, small animals, fruits, and leaves, and it possesses a long and large cæcum, about $\frac{1}{2}$ th the length of its body.

Chiromys is particularly partial to sugar canes, but also preys upon insects and larvæ. Its cæcum is still longer in proportion, being $\frac{1}{3}$ th the body length.

Stenops feeds principally on small birds and insects, yet its cæcum varies according to species. In *S. javanicus* it is long, and terminates in a narrow 'vermiform' process; in *S. tardigradus* this process is relatively short.

The *Galagos* feed on mice, small birds, insects, sweet fruits and juices; some of them possess a long and wide cæcum without a constricted 'vermiform' portion (*G. moholi*); in others (*G. calabariensis*) the cæcum is quite short.

The cæcum of *Tarsius* (a lemur which chiefly preys upon insects and lizards) resembles that of the last species.

In *Lemur varius* and in *L. flavifrons*, I found that the cæcum, taken in conjunction with its long 'vermiform' part, measured 8 inches, or a little less than half the body length.

Other genera might be cited, but the above are a sufficient number to show the extent of variation in the form of this part of the alimentary canal.

Cæcum of Lemur Varius: Position and Relations.—When distended with gelatine it resembles a long, narrow cone, bent upon itself in such a way that the 'vermiform' part extends upwards, lying alongside and parallel to the basal end, as well as to the ascending colon. The point of the 'appendix' touches the duodenum where the latter crosses the fourth lumbar vertebra (Plate V. (B.), C.). The ileum, guarded by a valve of two segments, opens into the cæcum almost at a right angle. The opening is situated in the lumbar region, above the brim of the pelvis and close to the commencement of the ascending colon. Unlike the human cæcum, which normally is limited to the right iliac fossa, that of the Lemur, which is large in proportion to the iliac fossa, extends upwards into the right lumbar, hypogastric, and umbilical regions of the abdominal cavity. The tapering part—not a true vermiform appendix—shows no constriction marking it off from the rest of the cæcum. It gradually narrows towards its apex. Three inches below the ileo-cæcal valve its calibre is reduced to 11 mm.—*i.e.*, much the same as that of the lower end of the ileum. At its apex the 'appendix' just admits the point of a porcupine quill. As it proceeds upwards it crosses in front of the right ureter at the level of the fifth lumbar vertebra (Plate V. (B.), U., C.).

The Ileo-cæcal Valve.—The entrance from the ileum into the cæcum closely resembles that of the human subject.

The valve guarding it consists of two segments—an upper and a lower. The segments are strongly built, with thick walls.

The Ascending Colon.—This segment of the large intestine having much the same calibre as the upper part of the cæcum, and both possessing a mesentery, it is questionable where one ends and the other begins. From the highest point of the iliac crest to the lower pole of the right kidney the large intestine (upper part of the cæcum and ascending colon?) measures $2\frac{1}{2}$ inches. Immediately above this it bends gradually forward into the hepatic flexure, which rests upon the front of the right kidney and touches the lower end of the right lobe of the liver. The termination of the hepatic flexure crosses in front of the transverse part of the duodenum. (Plate IV. (B.), C.). Between the iliac crest and right kidney the colon rests upon the 'vermiform' appendix which separates it from the right ureter.

The Hepatic Flexure.—The relation established between this part of the alimentary canal and the right lobe of the liver is not very intimate. In neither *Lemur varius* nor *L. flavifrons* did I find definite impressions on the liver produced by the gut. The feeble bend of the colon which constitutes the flexure in question barely touches the extreme lower end of the right lobe of the liver (*vide* Ascending Colon).

Its relations to the other neighbouring viscera are :—

In front.—Stomach.

Behind.—Right kidney; Duodenum (*vide* Ascending Colon).

The Transverse Colon.—The term transverse colon can hardly be applied with tolerable accuracy to the part of the large intestine which crosses the abdominal cavity. From the hepatic to the splenic flexure the intestine pursues a curved course. In both *Lemur varius* and *L. flavifrons* I found it was somewhat U shaped. The length of the curve

varied in the three specimens which I dissected. In *Lemur flavifrons* it was 4 inches long, reaching nearly to the symphysis. In the male of *L. varius* it was only half that length, the stomach completely covering it in front. In the female of *L. varius* it measured $2\frac{1}{4}$ inches.

The Splenic Flexure.—As before stated, this part of the large intestine is placed at a lower level than the hepatic flexure; *the opposite to the condition found in Man.* It is related to the lower third of the anterior surface of the spleen upon which it rests, whilst the fundus of the stomach partially covers it in front.

The Descending Colon and Rectum.—The remainder of the large intestine—*i.e.*, from the splenic flexure to the anus—takes a rather straight course downwards. Above the brim of the pelvis it is placed close to the left side of the vertebral column; below this it inclines to the right, so that the rectum (the part of the colon below the brim of the pelvis) occupies a mesial position, which it maintains for the rest of its course.* The tube gradually narrows until the ‘rectal’ pouch is reached. Here the rectum widens considerably, having a calibre of 18 mm.

Relations.—(A.) *Descending Colon.*—Anteriorly it is covered by coils of the small intestine, except the lower portion of the ileum, which runs external and parallel to it. The left ureter descends on its posterior aspect (Plate V. (B.), II., D C., U.).

(B.) *Rectum.*—The sacrum and coccyx support it behind, the ureters descending on either side. In the male the bladder, seminal vesicles, and prostate are related in front and above the “rectal pouch,” below which the rectum is related anteriorly to the urethra and bulb of the penis (Plate II.).

In the female the uterus and vagina intervene between the front of the rectum and the back of the bladder and

* I found this to be the case in both *Lemur varius* and in *L. flavifrons*.

urethra. In both sexes the greater part of the 'rectal' pouch lies below the reflection of peritoneum.

Total length of large intestine, $23\frac{1}{2}$ in., or 58·7 cm.

Length of cæcum, $9\frac{1}{2}$ in., or 23·7 cm.

„ ascending colon, $2\frac{1}{2}$ in., or 6·5 cm.

„ hepatic flexure, $2\frac{1}{2}$ in., or 6·5 cm.

„ transverse colon, 2 in., or 5 cm.

„ splenic flexure, $1\frac{1}{2}$ in., or 3·7 cm.

„ descending colon, 3 in., or 7·5 cm.

(to brim of pelvis.)

„ rectum, $2\frac{1}{2}$ in., or 6·2 cm.

Amount covered by peritoneum (rectum), 4 cm.

SOLID VISCERA.

THE LIVER.

This is a rather irregularly shaped organ, which seems to differ in form according to species.

In *Lemur varius* it is long and narrow, the left side being deeply excavated for the reception of the stomach.

Lobes.—The right, left, and cystic lobes are distinct, being separated by deep fissures. The left is but partially subdivided by two short fissures in front and behind. On the under surface of the right lobe are two smaller processes of liver substance; these, from their position, seem to correspond to the *lobus spigelii* and *quadratus*. The former of the two is an elongated pointed process (3·5 cm.), which springs from the left posterior angle, behind and to the left of the hilum. Of the three primary lobes the cystic is the largest. It is partially subdivided by the suspensory notch.

In *L. flavifrons* the left lobe is only faintly notched behind, showing no further sign of subdivision. Moreover, in the specimen which I dissected, the posterior surfaces of the cystic and left lobes appeared to blend to a small extent.

The former, together with the right lobe, was again divided into three processes. One of the processes of the cystic lobe was much smaller than either of the other two.

I noticed that the liver of *L. flavifrons* was broader and shorter than that of *L. varius*.

In *Chiromys*, according to Owen, neither the right nor left lobe is subdivided, although the cystic is distinct and separate. In this animal the left lobe is the largest.

Fissures and Grooves.—The fissure for the inferior vena cava on the posterior surface of the right lobe is well marked, and measures 5 cm. in length. It is converted into a tunnel for a short part of its course by a bridge of liver substance. The transverse fissure (hilum) is narrow, so that the structures entering and leaving the liver are very close together. Of these, the hepatic artery occupies the most anterior position.

The bile duct comes next, being placed to the right of and slightly behind the artery, while the portal vein lies behind and between both. The suspensory or longitudinal fissure, which is 2 cm. in length, partially divides the anterior surface of the cystic lobe. On the back of the left lobe there is a groove (1.5 cm. in length), which lodges the intra-abdominal stage of the oesophagus.

The fissure for the gall-bladder is situated in the upper part of the right margin of the cystic lobe and looks into the hepatic recess. It is rather irregular in shape, being constricted about its middle, and wider below than above (Plate IV. (B.), G. B.).

Peritoneal Relations.—The liver receives a large investment of peritoneum, but on its posterior surface there is a limited area uncovered. This is bounded by the superior and inferior coronary ligaments, which, meeting at the right and left extremities of the organ, form the lateral ligaments. The suspensory ligament is lodged in a fissure of the same name (*vide supra*).

Position in the Abdominal Cavity.—The greater part of the liver lies under shelter of the lower costal arches, but the extremity of the right lobe extends a little below the thirteenth rib. The cystic reaches the eleventh costal cartilage; the left lobe the twelfth. The lower border of the left lobe is thin and sharp, and part of it crosses the middle line, so that the bulk of the liver is situated on the right side of the body. The superior surface is highly convex, extending up to the sixth costal cartilage in front. It is composed of the cystic lobe, and occupies the greater part of the cupola of the diaphragm (*vide* Part I., p. 673).

Relations.—The left lobe is deeply sculptured out for the reception of the stomach. The lesser curvature of the latter is covered in front by the overhanging lower margins of the left and cystic lobes. The duodenum and pylorus are lodged in the *elongated hepatic recess*. The right kidney and its suprarenal body leave a single deep impression on the under surface of the right lobe of the liver. The impression of the hepatic flexure is barely perceptible, seeing that this part of the gut is not intimately related to the under surface of the liver (Plate IV. (A.) and (B.), L., L., L.).

GALL-BLADDER AND HEPATIC DUCTS.

The gall-bladder is a narrow, rather pyriform bag, partially twisted on itself, and gradually tapering into a very long coiled cystic duct, which in turn is joined by several smaller hepatic ducts emerging from the subdivisions of the cystic and right lobes. The duct of the gall-bladder terminates by joining a larger one which receives several smaller biliary tubes passing from the cystic and left lobes.

The junction of the cystic and larger ducts forms the common bile duct. At the hilum of the liver it is placed to the right of and slightly behind the hepatic artery. Pursuing its course downwards, the common bile duct passes

between the two layers of the gastro-hepatic omentum and behind the duodenum, until the upper third of the vertical stage is reached. It then pierces the wall of the duodenum and is joined by the pancreatic duct (see Pancreatic Duct, p. 462).

Relations.—The gall-bladder and upper portion of the cystic duct abut against the duodenum, as it lies in the hepatic recess (Plate IV. (B.), G. B.).

Position.—The cystic fissure has been described. In *Lemur flavifrons*, the form, position, and relations of the gall-bladder and hepatic ducts closely resemble those of *L. varius*, except that in the latter species the cystic duct is longer and more convoluted. In *L. flavifrons* the common bile duct is only half as long as that of *L. varius*.

<i>Lemur varius</i> .—Length of gall-bladder,	- 3 cm.
,, cystic duct, ^a	- 16 cm.
,, common bile duct,	- 4 cm.
<i>Lemur flavifrons</i> .—Length of gall-bladder,	- 3 cm.
,, cystic duct,	- 9 cm.
,, common bile duct,	- 2 cm.

Observe—The gall-bladder is the same length in the two species.

THE SPLEEN.

Considering that this organ, during the process of development from mesoblast within the substance of the mesogastrium, slowly grows out along the paths of least resistance, it is not surprising to find it presenting great variation both in shape and position, even in closely allied animals.

The *Lemurian* spleen follows the quadrupedal type rather than that of *Anthropoids*. In *Chiromys* it is an elongated trihedral body, bent at almost a right angle on itself, the lower part being nearly half the length of the upper part (Owen). In *Lemur varius* I found that the bend was less

^a The cystic ducts were unravelled before their measurements were taken.

pronounced, giving the organ a more curved outline. In *L. flavifrons*, in addition to being curved, the spleen appeared to be twisted on its long axis. The shape is straight and rather long in *Platyrrhine* monkeys. In *Catarrhines* it is shorter, thicker, and with a tendency to broaden out. I noticed this in the spleen of the following apes :—

1. *Cynocephalus mornon*.
2. *Cynocephalus babwin*.
3. *Cynocephalus sphinx*.
4. *Macacus innuus*.

The anthropoid and human spleens bear a resemblance to one another. In the *gibbon* this viscus is rather triangular in outline. The inner surface is marked with the impressions of neighbouring viscera. Among other orders of mammals the spleen varies to such a degree that space will only permit of a brief description of a few of the better known types. In the order *Rodentia* it is often a thin, long-shaped structure, but in some rats I noticed a tendency to a triangular shape. In porcupines and agoutis it ranges from round to oblong (Owen). Curiously enough, according to Hunter,^a the capibara and human spleens closely resemble each other in shape. Among the *Cetaceans* it is usually multilobed. In *Ruminants* it is elongated and flattened.

In a deer, the body of which measured 19 inches, I observed that the spleen was very small and chiefly related, on its inner side, to the stomach. In *Carnivora* there is much variation. In the young cat I found it to be an elongated and somewhat curved viscus; whereas in a terrier dog^b (18 inches in length) the spleen was rather three-sided in outline, the angles being prolonged into pointed processes.

^a *Vide* Owen. Comparative Anatomy of Vertebrates. Vol. III., p. 560.

^b The spleen of a setter dog described by Owen was oblong. *Ibid.*, p. 561.

The spleen of the fox appeared less angular and longer than that of the dog.

Position and Relations.—The spleen of *Lemur varius* is crescentic in shape. It presents three distinct surfaces—a posterior, partially covered by the pleura, the diaphragm intervening, and crossed by the twelfth and thirteenth ribs; an extensive anterior surface, the upper two-thirds of which is related to the fundus of the stomach, the lower third to the splenic flexure of the colon; and an inner concave surface which is tucked round the outer and convex border of the left kidney. The surfaces are separated by three borders. Of these, the outer is notched and convex, and longer than either the anterior or posterior, which are concave in shape. The termination of the duodenum, where it turns forward to form the duodeno-jejunal flexure, almost touches the lower extremity or pole of the spleen. (See page 449.)

In the female of *Lemur varius* I found that the tail of the pancreas reached to the anterior border of the spleen, a little below its middle. In the male the pancreas (being shorter) did not touch the spleen (Plates III., S.; IV. (A.), SP.; V. (B.), S.).

Relations to the Vertebral Column.—The long axis appears to be more vertical than that of the human subject, and the organ is placed relatively lower down in the abdominal cavity. The upper pole reaches to the level of the head of the thirteenth rib. The lower pole extends downwards to the level of the transverse process of the fourth lumbar vertebra. The upper one-fourth of the posterior surface, as it lies under the pleura and diaphragm, is crossed by the twelfth and thirteenth ribs and their costal cartilages. The markings of the ribs are evident on this part of the spleen.

Length of the spleen	-	-	8 cm.
Breadth „ „	-	-	2 cm.
Thickness „ „	-	-	1 cm.

THE PANCREAS.

Like the spleen, the pancreas is a viscus which varies to a great extent. Its shape seems to depend a good deal upon the way that it is moulded by the pressure and counter-pressure of neighbouring viscera. It frequently exhibits remarkable differences in form, even in the same species of animal.

In *Lemur varius* the pancreas of the male (which I dissected) was longer and narrower than that of the female. In the former, however, immediately to the right of the inferior vena cava, the pancreas expands a little, sending a short, pointed process upwards, in front of the right kidney to the lower border of the suprarenal capsule. Proceeding further towards the right, it tapers, and then expands again, a deep notch being thus formed between the two thickenings (Plate III.). Finally it turns sharply downwards for a short distance along the inner side of the vertical stage of the duodenum. This portion constitutes the "lesser pancreas." It terminates in several fringed processes, which extend below the level of the common entry of the bile and pancreatic ducts. The duodenal end of the pancreas in the female is expanded also, but not deeply notched, nor are the fringes of the "lesser pancreas" so marked; in fact, they are represented by three short and rather thickened processes which diverge from each other.* This is not unlike the pancreas of *Chiromys*, described by Prof. Owen as "a broad, thin gland, extending and expanding from near the spleen to the duodenum, and thence continued, as the small pancreas, a little way beyond the entry of the duct, which is close to that of the gall duct; here the gland sends off some short, narrow processes into the folds of the mesentery."

Position and Relations.—The main part of the gland stretches obliquely downwards, across the abdominal cavity

* The pancreas is such a variable organ that this description must not be taken as general. It refers only to the shape of the pancreas of the female *Lemur* which I dissected.

from right to left, crossing the second lumbar vertebra.
The posterior relations are:—

Right kidney.
Inferior vena cava.
Aorta.
Left suprarenal capsule.
Left kidney.

The left extremity or "tail" is related to the anterior border of the spleen.^a The stomach is situated in front, and by the backward pressure that it exercises when distended the pancreas becomes flattened to a considerable extent.

Unlike the human subject, neither the flexure duodeno-jejunalis nor the transverse colon is related to the inferior aspect of the Lemurine pancreas.

Dimensions of the Pancreas.

<i>Male.</i> —	Length (omitting the lesser pancreas)	5·5 cm.
	Breadth (above downwards) -	- 6 mm.
	Thickness (dorso-ventral) -	- 2 mm.
	Length of "lesser pancreas" -	- 2·5 cm.
<i>Female.</i> —	Length (omitting the lesser pancreas)	5 cm.
	Breadth (above downwards) -	- 8 mm.
	Thickness (dorso-ventral) -	- 2 mm.
	Length of "lesser pancreas" -	- 1·5 cm.

N.B.—In both sexes the distance between the upper border of the pancreas and the commencement of the duodenum measures 3 cm.

THE PANCREATIC DUCT.

This canal begins at the splenic end of the pancreas and travels in the direction of its long axis, towards the duodenum. It lies embedded in the substance of the gland, and receives several tributaries from the processes of the "lesser pancreas." It is of a whitish colour, and, at its termination, has acquired a calibre which exceeds that of the common bile duct. Its

^aIn the female only. (*Vide* p. 460).

length is about 6.5 cm. It runs obliquely downwards in the substance of the duodenal wall for a distance of 6 mm., and then joins the common bile duct. Before piercing the duodenum, the latter is placed at a lower level than the pancreatic duct.

Length of the common bile duct within the substance of the duodenal wall, 6 mm.

Length of the common pancreatobile duct within the substance of the duodenal wall, 5 mm.

Position of the common orifice of the two ducts, 4 cm. below the commencement of the duodenum. The opening is situated on the postero-internal aspect of the gut.

THE KIDNEYS.

The kidneys of the Lemur conform to those of the higher mammalian type. Their surfaces show no signs of lobulation. The superior and inferior extremities are rather blunted and about of equal thickness. The convex outer border of the left kidney is flattened so as to form a surface which is clasped by the concave surface of the spleen (*vide* Plate III.). This kidney, therefore, presents three surfaces^a—an anterior, which looks forwards and outwards; a posterior, looking inwards and backwards; and, between these, an external surface. Separating the surfaces are three borders—an anterior, directed forwards and outwards; a posterior looking backwards and outwards, both of which are rounded and ill-defined; the third or internal border looks forwards and inwards, and about its middle the *hilum* is situated.

Relations.—The posterior surface is distinctly mapped out by a conspicuous longitudinal ridge, into an inner and an outer area, which, inclining forwards, give a bevelled appearance to the back of the kidney. These sloping or bevelled

^a I found three surfaces present on the left kidney of *Lemur flavifrons* also.

districts are produced by the pressure and counter-pressure of neighbouring muscles. The inner area is in contact with the psoas ; the outer with the quadratus lumborum, and, in the case of the right kidney, with the posterior and lower part of the diaphragm also.

Anterior Surface of the Right Kidney.—This is flatter than the corresponding surface of the left kidney. Four viscera are related to the front of the right kidney. They are :—

The liver.

The pancreas.

The hepatic flexure of the colon.

The duodenum.

The pancreas crosses the hilum to reach the duodenum. In man, the duodenum is usually situated in front of the hilum, so that the pancreas fails to reach the right kidney. The colic impression, which occupies the lower one-fourth of the anterior surface, is rather oblique, forming an inferior inclined plane.

Anterior Surface of the Left Kidney.—Two pronounced sloping planes are manifest—an upper, produced by the stomach ; and a lower, by the colon. Between these the pancreas is related to the front of the left kidney (Plate III.).

Inferior Relations.—These have been described on page 444.

Superior Relations.—The suprarenal bodies situated above the upper poles of the kidneys will be described separately. The relations of the pleura and diaphragm to the kidneys have been dealt with on page 443.

Position in the Abdominal Cavity.

Right Kidney.—This is placed at a higher level than the left kidney.

The upper end reaches to the level of the upper border of the first lumbar vertebra, and is 7 cm. distant from the highest point of the iliac crest ; the lower end extends to

the lower border of the second lumbar vertebra. The hilum is opposite the upper border of the second lumbar vertebra, and is 2.5 cm. distant from the middle line.

The thirteenth rib lies immediately above the posterior surface of the right kidney.

The tip of the thirteenth costal cartilage is opposite the hilum.

Left Kidney.—The upper pole of the left kidney extends to the upper border of the second lumbar vertebra, and is 6 cm. distant from the highest point of the iliac crest; the lower pole reaches to the middle of the third lumbar vertebra. The hilum is opposite the lower border of the second lumbar vertebra, its distance from the vertebral column (middle line) being the same as that of the right kidney.

Dimensions.

		Female.		Male.
<i>Left Kidney.</i> —	Length	- 3.5 cm.	-	- 3.7 cm.
	Breadth	- 2.2 cm.	-	- 2.2 cm.
	Thickness	- 2 cm.	-	- 2 cm.
<i>Right Kidney.</i> —	Length	- 3.5 cm.	-	- 4 cm.
	Breadth	- 2.7 cm.	-	- 2 cm.
	Thickness	- 1.5 cm.	-	- 1.5 cm.

Observe—The left kidney in male and female is thicker than the right kidney. This is brought about by the pressure exerted by the spleen in a direction from without inwards, causing the convex outer portion of the kidney (the outer border of the human kidney) to become thickened into a distinct splenic surface.

From the above measurements it may be seen that both the right and left kidneys of the male exceed (in length) those of the female, although the breadth is much the same in both sexes.

The kidneys of *Lemur varius* appear to be small when com-

pared with the other abdominal viscera ; also in *L. flavifrons*, as may be seen by the following measurements :—

	Right		Left.
Length	- 2·7 cm.	-	- 2·9 cm.
Breadth	- 1·6 cm.	-	- 1·5 cm.
Thickness	- 1·2 cm.	-	- 1·4 cm.

Renal Vessels and Duct.—In both *Lemur varius* and *L. flavifrons* the left renal vein is more than double^a the length of the right one. At the hilum the renal structures are arranged in the same order as in the human subject—viz., vein, artery, duct or ureter, in the order from before backwards.

THE URETERS.

The portions of the intestine which lie in front of the ureters have been mentioned on page 444. Leaving the hilum of the kidney each ureter descends on the psoas muscle to the brim of the pelvis. In the male the duct is continued over the external iliac artery, until it reaches the bladder, which it enters immediately above the top of the prostate.

In the female, the ureter, on entering the pelvis, crosses over both external and internal iliac vessels, and thence by the side of the uterus and vagina to the bladder, which it enters close to the commencement of the urethra. In both sexes the ureters pierce the bladder wall very obliquely (Plate II., Ur. ; Plate V. (B.) U.).

Length of Ureters.

		Male.	Female.
<i>Lemur varius</i> .—	Right ureter	- 14·5 cm.	- 15 cm.
	Left ureter	- 13·5 cm.	- 14·2 cm.
<i>Lemur flavifrons</i> .—	Right ureter	- 8·5 cm.	—
	Left ureter	- 11 cm.	—

^a Left renal vein of *Lemur varius* = 2·2 cm.

Right „ „ „ = 6 mm.

Left renal vein of *L. flavifrons* = 3 cm.

Right „ „ „ = 1·4 cm.

THE ADRENAL BODIES.

Unlike the adrenals of man, those of *Lemur varius* do not touch the upper poles of the kidneys. They are separated by large pads of firm, fatty tissue, which, in position and form, resemble the human adrenals. The pads of fat are rather triangular in shape, with excavated bases, which receive the upper ends of the corresponding kidneys. The adrenal bodies are somewhat elongated and flattened, their lower ends being slightly embedded in the apical and inner portions of the pads of fat. Each adrenal is situated closer to the mesial plane than the upper end of its corresponding kidney, the left more so than the right.

Position and Relations.—The inferior vena cava and under surface of the right lobe of the liver are in relation to the anterior surface of the right adrenal. The stomach lies in front of the left one, but, unlike the human subject, neither spleen nor pancreas is related to it. In the Lemur the adrenals are supported posteriorly by the crura of the diaphragm. From the inferior aspect of the left adrenal a large vein issues which joins the renal vein of its own side. The right adrenal extends to the level of the upper border of the thirteenth dorsal vertebra; the highest point of the left is opposite the middle of the first lumbar vertebra (Plate III., R.S.C., L.S.C.).

Dimensions.

	Right.				Left.
Length	-	-	1.2 cm.	-	1.5 cm.
Breadth	-	-	6 mm.	-	4 mm.
Thickness	-	-	3 mm.	-	3 mm.

Observe—The left is longer and narrower than the right, while both are of equal thickness.

PELVIC VISCERA.

The position and relations of the rectum have been described with the descending colon (*vide* p. 454).

THE BLADDER.

This organ differs but little in shape in the two sexes. It is more or less pyriform, the lower end being narrower than the upper. It is somewhat broader in the male than in the female. When empty, its long axis is directed from above downwards and backwards. The walls of the bladder are strong and thick, and after the urine is expelled the mucous membrane is markedly sacculated, and the lumen, in both sexes, is represented by an elongated slit, with which the urethra becomes continuous in a straight line.

Position.—Many of the abdominal and thoracic viscera are placed at a relatively lower level in the *Lemur* than in *Man* (*vide* Part I., pp. 665–672). This is not so in the case of the bladder. The position of this organ in *Lemur varius* closely follows that of the human infant, being thus placed at a higher level than in the adult.

In the male the urethra emerges from the bladder at the level of the upper border of the symphysis. In the female the commencement of the urethra is situated a little lower down. Almost the entire organ projects above the pelvic brim, the superior extremity reaching to the level of the upper border of the second sacral spine.

Relations.—The peritoneal relations have been dealt with. In the male the large seminal vesicles separate the lower part of the posterior surface of the bladder from the front of the rectum. The vas deferens and ureter are placed at either side, while the prostate embraces the lower and tapering end. The front of the bladder comes into contact with the posterior aspect of the anterior abdominal wall. The upper part of the posterior surface, together with the superior extremity, are separated from the rectum by coils of the small intestine (Plate II. (B.)).

The posterior surface of the female bladder is separated along its whole length from the rectum by the median

portion of the uterus and the vaginal canal. The superior extremity^a projects a little above the bifurcation of the uterus into its two cornua. The termination of the ureters in the bladder wall has been described in both sexes.

Dimensions of the Empty Bladder.

	Male.	Female.
Length - -	2.3 cm. -	2.2 cm.
Breadth - -	1.8 cm. -	1.2 cm.
Thickness - -	9 mm. -	8 mm.

MALE ORGANS OF GENERATION.

Prostate.—This is a large gland when compared with the size of the bladder. It is conical in shape, with its base, which is partly divided into two lateral lobes, looking upwards. The greater part of the body of the prostate embraces the commencement of the urethra. Posteriorly, the gland is thickened so as to form a third lobe, which shows indistinct indications of a further subdivision into two portions.

Positions and Relations.—The prostate extends from the middle to the upper border of the symphysis pubis. From this it is separated by a pad of fat. It lies above and in front of the 'rectal' pouch. Between its posterior and lateral lobes, which partly embrace the lower end of the seminal vesicles, the common seminal duct opens into the urethra. In both *Lemur varius* and *L. flavifrons* the prostate is a strong and compact body. In the former species it is about 1.5 cm. in length, and about 1 cm. across its broadest part.

Seminal Vesicles.—These are also large proportionately. They consist of a pair of elongated, coiled tubes, occupying three turns of a spiral. Their position relative to the prostate, bladder and rectum has been described. When uncoiled they measure 2 cm. in length, with a calibre of 4 mm. The vasa deferentia near their termination lie along the inner

^a In both sexes the peritoneum is reflected from the superior extremity of the bladder along the line of the urachus.

sides of the seminal vesicles. It is interesting to note that these structures are absent in *Chiromys* (Owen).

The peritoneal relations of the prostate and seminal vesicles have been described.

The Urethra.—The male urethra is 7 cm. in length. The portion which traverses the prostate measures 1 cm. ; between the apex of the prostate and the bulb of the penis it is 2 cm. long, the spongy portion being 4 cm. The urethral canal is curved ; it is concave behind, where it is related to the front of the 'rectal' pouch, and concave in front as it traverses the bulb of the penis.

The Vasa Deferentia.—These ducts measure about 10·5 cm. each. The intra-pelvic portions are 6 cm., the inguinal and scrotal, taken together, amount to 4 cm. In the pelvis the vasa deferentia cross internal to the external iliac arteries. They are at first related to the sides of the bladder, but towards their termination they are placed behind it. Here they lie to the inner side of the seminal vesicles, which they join to form a common seminal or ejaculatory duct, the position of which has been described.

The Testes and Penis.—The epididymis is well marked off from the *body* of the testes. The latter part is somewhat flattened from side to side. Each testis measures 4 cm. long and 2 cm. broad. The scrotum is only slightly pendant. In *Chiromys* it is sessile (Owen).

From the bulb to the end of the glans the penis is about 4 cm. The glans is somewhat expanded and rounded. A small ossicle is present, which is to be found in the penis of many other species of Lemur.

FEMALE ORGANS OF GENERATION.

Uterus and Vagina.—A bicornuate uterus is one of the characters of the members of the Lemurian order. Some genera also show an elongated, common utero-vaginal cavity

(*Tarsius*, *Stenops*, *Perodicticus*), and a clitoris perforated by the urethral canal. In *Chiromys*, the uterus is differentiated from the vagina, and the clitoris is distinct from the urethra (Owen).

In *Lemur varius* I found that the lower end of the bicornuate uterus projected into the cavity of the vagina in the form of two distinct lips (orificium externum uteri), one anterior, the other posterior. Above these lips the vaginal canal terminates in the form of two narrow recesses or 'fornices.' The single part of the uterus is situated in the middle line of the pelvis, between the bladder in front and the rectum behind. The cornua arise as angular projections from the upper end of the single part. Their origin corresponds to the level of the middle of the second sacral spine. They extend outwards and upwards in front of the rectum towards the lateral wall of the pelvis. Some coils of the small intestine and a considerable amount of fatty tissue intervene between the rectum and uterus. The peritoneal relations have been described.

	<i>Dimensions.</i>		
<i>Uterus</i> .—Single part	-	-	15 mm. in length
Left cornu	-	-	14 mm. in length
Right cornu	-	-	10 mm. in length
<i>Vagina</i> .—Total length	-	-	20 mm.
Amount covered by peritoneum (behind), 12 mm.			
Amount covered by peritoneum in front, 14 mm.			
Uncovered (behind)	-	-	8 mm.
„ (in front)	-	-	6 mm.

The clitoris is 6 mm. in length, and is perforated by the urethral canal; the latter measures 20 mm., *being much longer in proportion than that of the human subject.*

The Ovaries and Oviducts.—The ovaries are two small, oval-shaped bodies, with their sides rather compressed, the postero-external more so than the antero-internal. They measure 6 mm. long by 3 mm. broad. Each ovary occupies the lateral wall

of the pelvis of its own side. They are situated about 4 mm. above the summit of the empty bladder. The oviducts (Fallopian tubes) are convoluted, and partially embrace the ovaries. The former take a tortuous course inwards to reach the respective cornua of the uterus. The extremities of the oviducts are fimbriated; when uncoiled they measure 20 mm. in length.

Dimensions of the Pelvis.

Unlike the human subject, the size and form of the pelvis do not differ to any degree in the two sexes. Furthermore, the antero-posterior and transverse diameters of the brim are the same in the male and female—viz., 3 cm.

The diameters of the outlet are slightly greater in the female.

Male—Transverse, 1·7 cm. Antero-posterior, 2·2 cm.

Female—Transverse, 2 cm. Antero-posterior, 2·5 cm.

Length of the symphysis pubis in both sexes, 2·2 cm.

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See Part I., page 674, Transactions of the Royal Academy of Medicine in Ireland, 1899.

EXPLANATIONS OF THE PLATES.

PLATE I.

STOMACH OF LEMUR.

From a photograph of a specimen hardened *in situ* with formalin and moderately distended with warm injections of gelatine.

F. = Fundus.
Py. = Pylorus.
L.C. = Lesser Curvature.
G.C. = Greater Curvature.
Æs. = Œsophagus.
F.T. = Fibrous Band.
P. = Pyloric Opening.

PLATE II.

Drawing of a mesial section through the Pelvis of the male Lemur.

<i>R.</i> = Rectal Pouch.	<i>S.</i> = Symphysis.
<i>B.</i> = Bladder.	<i>A.</i> = Anus.
<i>S.V.</i> = Seminal Vesicle.	<i>Ur.</i> = Ureter.
<i>P.</i> = Prostate.	<i>V.d.</i> = Vas deferens.
<i>U.</i> = Urethra.	

PLATE III.

Drawing of the Duodenum, Pancreas, Kidneys, Adrenals and Spleen.

<i>D.</i> = Duodenum.	<i>L.S.C.</i> = Left Adrenal.
<i>P.</i> = Pancreas.	<i>S.</i> = Spleen.
<i>R.K.</i> = Right Kidney.	<i>F.F.</i> = Fat between Adrenals and Kidneys.
<i>R.S.C.</i> = Right Adrenal.	
<i>L.K.</i> = Left Kidney.	

PLATE IV.

Two drawings of the Thoracic and Abdominal viscera, as seen in profile. They illustrate the topography of the organs and their relations to the vertebral column :—

(A.) LEFT SIDE.		(B.) RIGHT SIDE.	
	1. <i>D.S.</i> = 1st Dorsal Spine.		1. <i>D.S.</i> = 1st Dorsal Spine.
	13. <i>D.S.</i> = 13th Dorsal Spine.		<i>R.13</i> = Rib 13.
	<i>R.13</i> = Rib 13.	<i>Lung</i> {	<i>F.M.</i> = Main Fissure.
<i>Lung</i> {	<i>C.F.</i> = Cardiac Fissure.		<i>U.F.</i> = Upper Fissure.
	<i>F.M.</i> = Main Fissure.		<i>D.</i> = Diaphragm.
	<i>D.</i> = Diaphragm.		<i>L.</i> = Liver.
	<i>H.</i> = Heart and Pericardium.		<i>G.B.</i> = Gall Bladder.
	<i>L.</i> = Liver.		<i>R.K.</i> = Right Kidney.
	<i>S.</i> = Stomach.		<i>DU.</i> = Duodenum.
	<i>DU.</i> = Duodenum.		<i>S.</i> = Stomach.
	<i>SP.</i> = Spleen.		<i>C.</i> = Colon.
	<i>L.K.</i> = Left Kidney.		<i>M.L.</i> = Middle Lobe of Lung.
	<i>C.</i> = Colon.		
	<i>IS.</i> = Isthmus of the Upper Lobe of the Lung.		

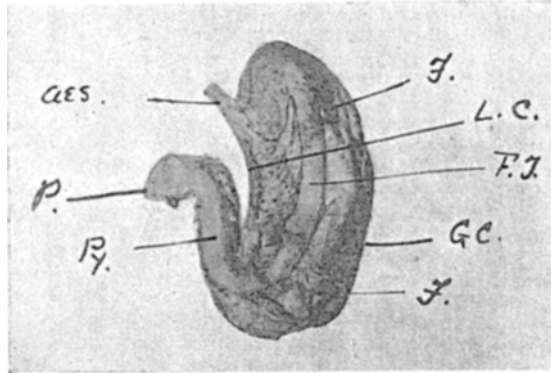
The position of the fissures of the lungs, also the impressions for the ribs, are very marked.

PLATE V.

Two drawings of the Thoracic and Abdominal viscera. A. From the front. B. From behind. The latter shows the relations of the organs to the vertebral column.

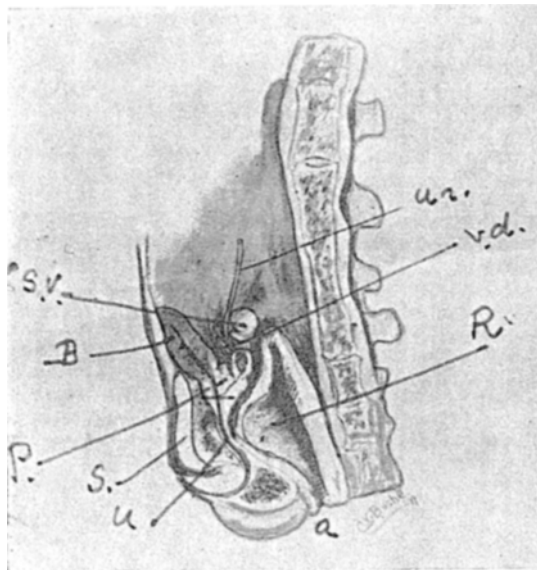
(A.)	(B.)
<i>H.</i> = Heart.	<i>L.</i> = Lung.
<i>Lg.</i> = Lung.	<i>Pl.</i> = Pleura.
<i>Pl.</i> = Pleura.	<i>D.</i> = Diaphragm.
<i>LL.</i> = Liver.	<i>K.</i> = Kidney.
<i>S.</i> = Stomach.	<i>S.</i> = Spleen.
<i>B.</i> = Bladder.	<i>D.C.</i> = Descending Colon.
<i>I.</i> = Small Intestine.	<i>IL.</i> = Ileum.
<i>D.</i> = Diaphragm.	<i>Du.</i> = Duodenum.
	<i>C.</i> = Cæcum.
	<i>U.</i> = Ureter.

PLATE I.



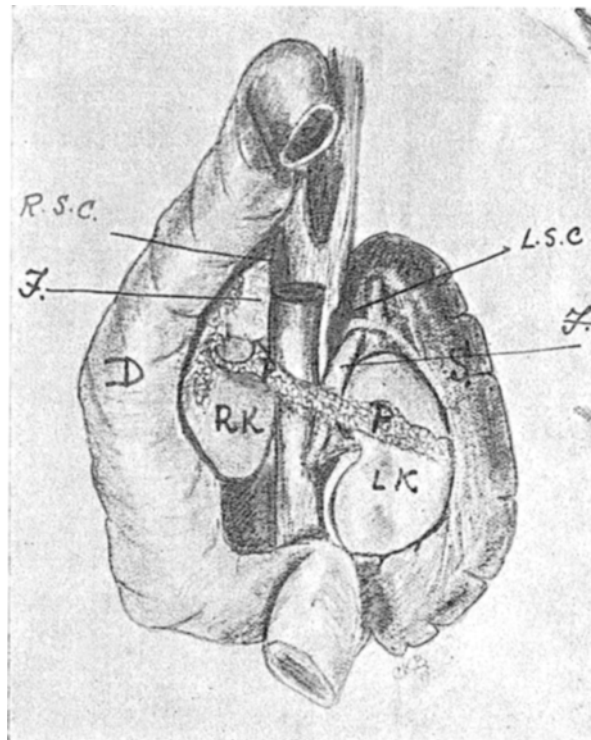
Stomach of Lemur.

PLATE II.



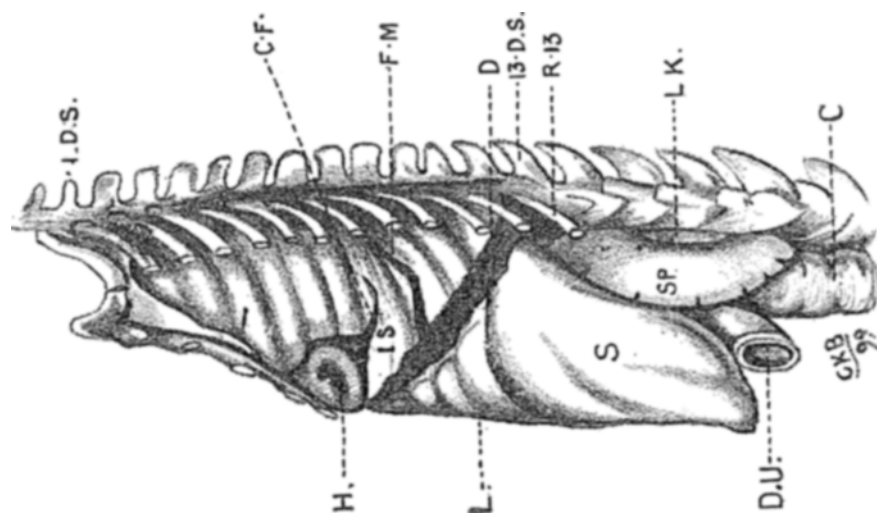
Mesial Section of Male Pelvis of Lemur.

PLATE III.



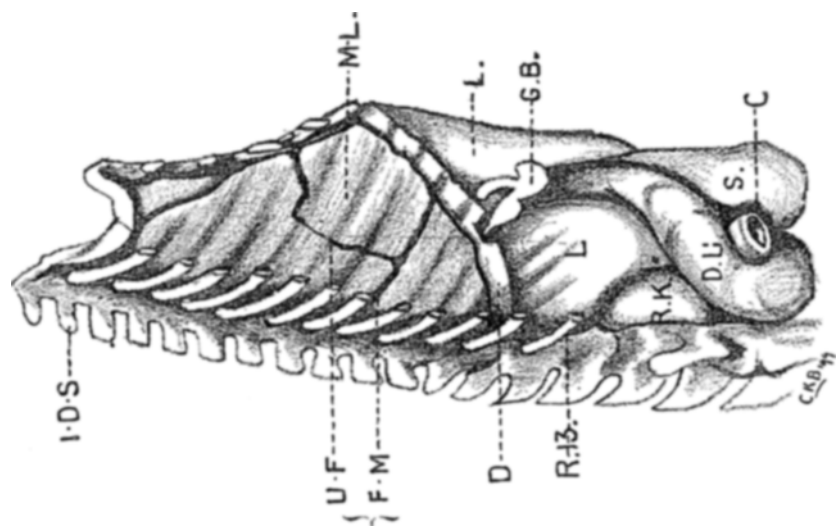
The Duodenum, Pancreas, Kidneys, Adrenals, and Spleen.

PLATE IV.



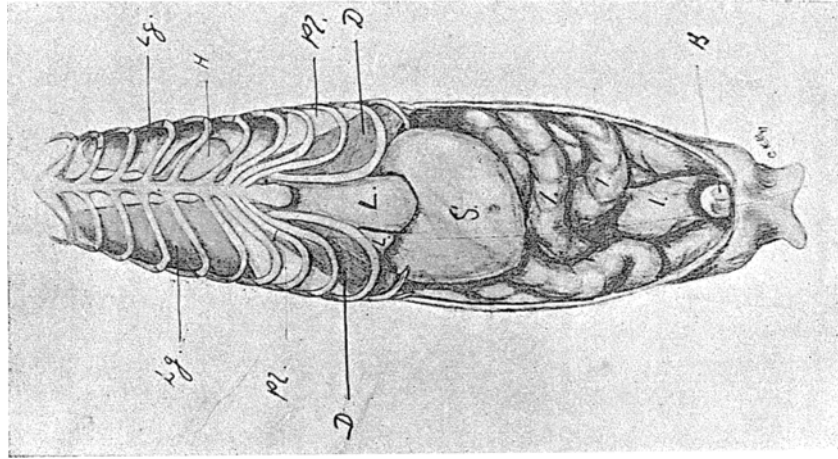
(A.)

Side View of the Thoracic and Abdominal Viscera of the Lemur.

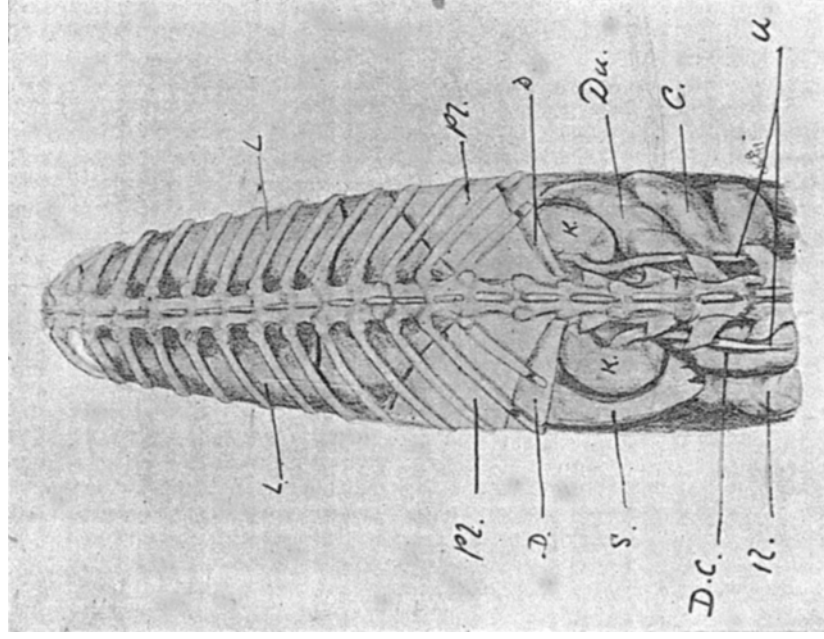


(B.)

PLATE V.



(A.)
Front View of the Thoracic and Abdominal Viscera
of the Lemur.



(B.)
Back View of the Thoracic and Abdominal Viscera of the Lemur.