FIGURE I.

THE CISTERNA MAGNA AND ITS RELATIONS
IN THE DOG

The head of the dog (Airedale-Terrier Cross adult) has been frozen in the normal position and then sectioned along the sagittal plane.

X - Cisterna magna.
A B1 - External Occipital Protuberance.
B - Atlas in Section.
C - Spinal Cord.
D - Dorsal Atlanto-Occipital Membrane stretching between B and D.
D D1 - Occipital Bone.
E - Cerebellum.

Note Dorsal Atlanto-Occipital Membrane stretching between B and D.
FIGURE 2.

THE CISTERNA MAGNA OF DOG.

The lettering is the same as for Fig. 1, of which figure 2 is an enlargement.
X-RAY PHOTOGRAPH (LATERAL) OF THE CISTERNA MAGNA OF LIVING DOG FILLED WITH RADIO-OPAQUE OIL.

The cisterna magna (A) and adjoining parts of the spinal subarachnoid space (B) have been filled with Lipiodol Descendant. The needle (C) with which the puncture was performed is in position. The head is flexed in position for cistern puncture.

D - External Occipital Protuberance.
E - Dorsal Arch Atlas.
F - Ventral Arch Atlas.
G - Dorsal Spine Axis.
XY - Outline of soft tissues of head and neck.
FIGURE 4.

Skulls of a Pekingese (No. 1) and an Irish Terrier (No. 2) showing the variation in development of the upper border (A) of the foramen magnum.
FIGURE 5.

THE ARTICULATED ATLAS AND OCCIPUT.

The skull has been flexed upon the atlas as in position for puncture.

D.E. - Mid-line.
A.B.C. - Referred to in text; pass through the wings of the atlas, the atlanto-occipital space and the external occipital protuberance respectively.
Figure 6.

X-ray photograph of the atlanto-occipital region.

Ventral-dorsal view; D-E - mid-line. The atlanto-occipital space is outlined. The lines, A.B.C, pass through the wings of the atlas; the atlanto-occipital space and the external occipital protuberance respectively.
FIGURE 7.
THE OPERATION FIELD AS SEEN WITH THE SUBJECT IN POSITION.

The lines A, B, C, correspond to similarly lettered lines in figures 5, 6, etc.; D-E marks the mid-dorsal line of the neck.
FIGURE 8.

THE SKULL, ATLAS AND AXIS VIEWED LATERALLY.

The bones are articulated in a position corresponding to that at operation. The lines A, B, C, are the surface markings mentioned in the text, and correspond to similarly designated lines in figures 5, 6 and 7.
The head is flexed in position for puncture. The lines A, B, and C are referred to in text and are in the same relative position as in other figures.
FIGURE 10.
HEAD OF DOG IN POSITION FOR PUNCTURE.

The white paper follows the wing of atlas. A & C pass through wing of atlas and external occipital protuberance respectively, whilst the line B, halfway between A and C, is the line along which the needle must be directed.
LATERAL X-RAY PHOTOGRAPH SHewing NEEDLE B IN POSITION DURING CISTERN PUNCTURE.
Compare with figure 9; it will be seen that the needle lies along the track of figure 9 and exactly mid-way between A & C. This confirms the accuracy of the surface markings referred to in the text and illustrated in figures 5-10.
FIGURE 12.
LATERAL X-RAY PHOTOGRAPH OCCIPITAL REGION.

Shewing a needle A directed too far forward and impinging upon the occipital bone C.
B - External Occipital Protuberance.
E - Atlanto-occipital Membrane.
D - Dorsal Arch Atlas.
XYZ - Silhouette of soft tissues.
The photograph shows the articulated bones from above, with the skull flexed at right angles to the neck. The position of the sinuses, \( v, v \), is indicated in white.
FIGURE 14.

MICRO-PHOTOGRAPH OF WHITE CELLS IN THE C.S.F. OF DOG II; (15.3.28) AFTER SERIAL CISTERN PUNCTURE.
FIGURE 15.

LIPIODOL RESTING IN THE SPINAL SUBARACHNOID SPACE IMMEDIATELY AFTER INJECTION INTO THE CISTERN A MAGNA.

See Experiment 1.

A - Skull
B - Level of Atlas
C - Lipiodol.
The arrows indicate the irregularities in the borders of the shadow which are discussed in the text.  

L.6 = Sixth Lumbar Vertebra;  
L.7 = Seventh Lumbar Vertebra;  
S = Sacrum.
**Figure 17.**

The arachnoid cul-de-sac in dog 6, filled with lipiodol. (Lateral view)

L.4, L.5, L.6, L.7, indicate the respective lumbar vertebrae. S = Sacrum. Note how the cul-de-sac recedes from the floor of the canal as it passes towards the sacrum.
Figure 18. The appearance of lipiodol in the cul-de-sac of dog 6.8 weeks after injection.

Observe the appearance of globules, indicated by arrows, outside the limits of the cul-de-sac proper.

O.P. = os penis.
P.R. = prepuce (outlined).
FIGURE 19.

THE APPEARANCE OF THE OIL IN THE CUL-DE-SAC
OF DOG 6, TWENTY-EIGHT WEEKS AFTER THE
INJECTION.

Compare with figure 18. Arrows indicate globules of
oil lying in a position similar to that remarked in
figure 18.
FIGURE 20.
GLOBULES OF LIPIODOL IN THE CRANIAL CAVITY EIGHT WEEKS AFTER DESCENT EXPERIMENT.

A. - Globules of Lipiodol.
B. - Atlas.
FIGURE 21.
GLOBULES OF LIPIODOL IN THE CRANIAL CAVITY OF THE DOG FROM WHICH FIGURE 20 WAS OBTAINED; (LATERAL VIEW).

Arrows indicate the position of the oil.
FIGURE 22.


The arrow marked X indicates the expansion of oil referred to in the text. O.P. and O.I P' — os penis.
The oil dilatation, X, is seen to be composed of two parts and rests in the roof of the coccygeal canal. Note the tendency of the cul-de-sac to follow the inner boundaries of a curve in the spinal canal.

L.6 - 6th lumbar.
FIGURE 24.

OIL IN THE CUL-DE-SAC OF DOG 14, 220 DAYS AFTER INJECTION. (V-D. VIEW).

Observe in this photograph the shadow of the prepuce and the os penis. The preputial shadow is outlined in white ink (P, R). That of the os penis lies a little to the left of the sacral and coccygeal parts of the spine between O.P. and O', P'.
FIGURE 25.
THE THORACO-LUMBAR JUNCTION OF DOG 7.
SHewing A LUMBAR RIB (L. R.).

The lumbar rib appears also in figures 27, 28 and 29, and is marked L.R. in each case.
FIGURE 26.

AFTER 60 MINUTES SUSPENSION.

X — the defect in the outline at the level of the lumbo-sacral junction.

A, A! — indicates the projections along the borders of the sac which are described in the text.

O.P-O’P! — the shadow of the os penis.
The oil, A, in front of the obstruction has moved towards the head; the remainder, B, has remained locked within the cul-de-sac.
FIGURE 28.


Compare this with figures 26 and 27. A.A' and \( A^2 \) - lateral dilatations along the margin of the sac.

X - Marginal indentation and zone of reduced opacity.
FIGURE 29.

LATERAL VIEW OF THE CUL-DE-SAC OF DOG 7 AT THE CONCLUSION OF THE EXPERIMENTAL DESCENT.

A. - lumbo-sacral articulation.
B. - displaced cul-de-sac.
L-R - lumbar rib.

Observe the faecal material (C) in the posterior colon; the base (D) of the transverse process of L.6, disposed in the form of a horse-shoe.
FIGURE 30.
LIPIODOL IN THE LUMBO-SACRAL REGION OF DOG 7, 62 DAYS AFTER INJECTION INTO THE CISTERNA MAGNA.

The lettering is referred to in the text.
FIGURE 31.
LIPIODOL IN THE LUMBO-SACRAL REGION OF DOG 7, 62 DAYS AFTER INJECTION INTO THE CISTERNA MAGNA.

The lettering is referred to in the text.
FIGURE 32.

OIL IN THE LUMBO-SACRAL REGION OF DOG 7, 62 DAYS
AFTER INJECTION. (V-D VIEW).

The disposition of the globules can be seen a little
clearer than in figure 31, the lettering of which applies
also to this figure.
FIGURE 34.

THE CUL-DE-SAC OF DOG 8 FILLED WITH LIPIODOL.

The photograph was taken after 185 minutes in the upright position.

A - dilatation of the oil shadow within the first coccygeal vertebra.
C.P. - os penis.
P.R. - Prepuce.
X. - Lesion of spondyleitis deformans.
FIGURE 35.
LIPIODOL IN THE CUL-DE-SAC OF DOG 8 AT THE CONCLUSION OF THE EXPERIMENT.

Compare with figure 34 and note the development of a new dilatation (B). The dilatation at (A) appearing in figure 34 is still present.

X - Lesion of spondyleitis deformans.
A & B are probably the globules noted in Figure 35.

C. - A new globule of oil which has appeared.

O.B. - Os penis.

P.R. - Prepuce.

M. M I. M. 2. - Scrotum.
FIGURE 37.

LIPIODOL RESTING AROUND THE C-T JUNCTION IN DOG 8, THIRTY-FOUR DAYS AFTER AN EXPERIMENTAL DESCENT.

The oil has outlined the ventral border of the S-A space and, hence, defined approximately the lower contour of the spinal cord and its membranes. Observe how these structures retreat from the floor of the bony canal when negotiating the curve in its course.
The photograph was taken some weeks after a lipiodol injection experiment. Some of the oil (Y) lies along the floor of the S-A space and serves to outline the ventral contour of the spinal cord and its membranes. There is no evidence of deflection or distortion of the spinal cord in the neighbourhood of the affected articulation.
FIGURE 39.

PHOTOGRAPH OBTAINED POST-MORTEM, OF THE
DISSECTED LESION IN DOG 5. (LATERAL VIEW).

X - Projecting spur.
Y - Lipiodol lying along the floor of the S-A space.
FIGURE 40.

PHOTOGRAPH OBTAINED POST-MORTEM OF THE DISSECTED LESION IN DOG 5. (V-D VIEW).

X, X' - lesion.
A - 12th rib.
B - 13th rib.
L.I - 1st lumbar vertebra.
FIGURE 41.

THE SHADOW OF THE HEART, LIVER AND DIAPHRAGM IN RELATION TO THAT OF THE SPINE.

(V-D VIEW).

B, B', B' - liver (diaphragmatic silhouette).
C, C' - sternbrae.
FIGURE 42.

THE FIRST FIVE CERVICAL VERTEBRAE. (V-D VIEW).

- C1, C2, C3, C4, C5  - respective cervical vertebrae.
- B', B2  - Bifurcation of A; one arm runs into each posterior articular process.
- D, D  - spinous processes of other cervical vertebrae.
Figure 43. The lumbo-sacral and anterior coccygeal parts of the spine.
(Y-D view; female).

A = spinous process of L5.
B = ditto of L6.
C = ditto of L7.
D1, D2, D3 = anterior, middle and posterior thirds of the shadow of the sacral crest.
FIGURE 44.

THE APPEARANCE OF THE TRANSVERSE PROCESSES OF THE LUMBAR VERTEBRAE.

The photograph is an oblique lateral view so that both series of processes have been thrown into relief.

L.3, L.4, — the third, fourth— lumbar vertebrae.
A — distal ends of the processes.
B — horse-shoe-shaped shadow of the root of a process on L.5.

Observe that the processes of the more posterior vertebrae project farther downwards and forwards; note also that the roots of the processes on the same vertebrae are situated more dorsally than those on the anterior vertebrae.
FIGURE 45

THE COSTO-VERTEBRAL ARTICULATIONS.
FIGURE 46.
The Scapulae, Shoulder Joints, and the posterior part of the Trachea in relation to the spine.

A, A' - spine of the scapula.
X - terminal expansion of the spine of a scapula.
C - trachea shadow.
The column of oil A is arrested at the level of the tenth thoracic vertebra, the site of a compression fracture.
Observe the stationary mass of oil (A) the so-called "Axis Adhesion" situated at the level of the anterior border of the arch of the axis.
FIGURE 50.
TYPICAL ADHESIONS IN THE CERVICAL REGION.

Note the adhesion A, subjacent to the Atlanto-axial ligament.